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Technological Base Resources—China: The Chinese Aviation Industry Design and Development Process and Resources (U)

A Defense S&T Intelligence Study



Defense Intelligence Agency



Department of the Air Force

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**TECHNOLOGICAL BASE RESOURCES—CHINA:
THE CHINESE AVIATION INDUSTRY DESIGN AND
DEVELOPMENT PROCESS AND RESOURCES (U)**

Author: [REDACTED]

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DST-1830S-138-89

DIA TASK NO. PT-1830-01-04L

DATE OF PUBLICATION
11 AUGUST 1989

Information Cutoff Date
24 April 1989

This document supersedes DST-1830S-138-87, "Technological Base Resources—China: The Military Product Research and Development System (U)," dated 6 July 1987.

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PREFACE

(U) The purpose of this report is to examine the Chinese aviation industry design and development process and resources. It focuses on those facilities which were a part of the former Ministry of Aeronautics Industry. In March 1988, the Chinese military product industry underwent a massive reorganization. The former Ministry of Aeronautics Industry was merged with the former Ministry of Astronautics Industry to become the Ministry of Aero Space Industry. The new organization is now responsible for aircraft, space, and missile weapons programs.

(U) This document was prepared in response to DIA Task PT-1830-01-04L "Technological Base Management—China."

(U) Comments are invited and should be forwarded to the Defense Intelligence Agency (ATTN: DIA/DT-5A), Washington, D.C. 20340-6053.

TABLE OF CONTENTS

	Page
Preface	iii
Summary	ix
Section I Introduction (U).....	1
Section II Chinese Aviation Weapons Development Process.....	9
1. Development Process (U)	9
2. Funding (U)	13
Section III Aircraft Design and Development Facility Resources (U)	15
1. Institute of Aviation Research and Design, Shenyang (U).....	16
2. Helicopter Research and Design Institute, Jingdezhen (U)	19
3. Bomber Aircraft Research and Design Institute, Xian (U)	21
4. Fighter Aircraft Design Institute, Chengdu (U).....	23
5. Research Institute, Nanchang (U).....	25
6. Transport Aircraft Design Institute, Shanghai (U)	27
Section IV Aircraft Materials and Structures Facility Resources (U).....	29
1. Institute of Aeronautical Materials, Beijing (U)	30
2. Aircraft Strength Research Institute, Yaoxian (U)	32
3. Aircraft Thermal Strength Research Institute, Changan (U).....	36
4. Aeronautical Manufacturing Technology Research Institute, Beijing (U)	38
Section V Avionics Design and Development Facility Resources (U)	39
1. Airborne Radar Research Institute, Neijiang (U).....	40
2. Optical and Mechanical Research Institute, Luoyang (U)	41
3. Institute of Aeronautical Radio Electronics, Shanghai (U)	44
4. Flight Automatic Control Research Institute, Huxian (U)	45
5. Aeronautical Computer Technology Research Institute, Xian (U).....	46
Section VI Aircraft Propulsion Facility Resources (U)	47
1. Aeroengine Research Institute, Shenyang (U)	48
2. Nanhua Power Plant Research Institute, Zhuzhou (U)	50
3. Aircraft Engine Research Institute, Wuxi (U)	51
4. Gas Turbine Research Institute, Jiangyou (U)	51
Section VII Environmental Controls and Crew Escape Systems (U)	51
1. Research Institute of Aircraft Accessories, Xiangfan (U)	51
2. Aero Rescue Systems Research Institute, Xiangfan (U).....	51
Section VIII Air-to-Air Missile Development Facilities (U)	6
1. Air-to-Air Missile Dynamics Research Institute, Luoyang (U)	61
Section IX Wind Tunnel Test Support Facilities (U).....	6
1. Wind Tunnel Research Institute, Shenyang (U)	6
2. Institute of Aerodynamics, Harbin (U).....	6

TABLE OF CONTENTS (Cont)

	Page No.
Section X Flight Test Facility Resources (U)	69
Section XI Aircraft Design and Development Support Facilities (U)	73
1. Institute of Seaplane Research and Design, Jingmen (U)	74
2. 620 Research Institute, Beijing (U)	76
3. Institute of Scientific and Technical Information, Beijing (U)	77
4. 633 Research Institute, Shanghai (U)	78
5. 634 Research Institute, Beijing (U)	79
6. 641 Research Institute, Jingdezhen (U)	80
7. Aeronautical Institute, Nanjing (U)	81
8. Northwest Polytechnical University, Xian (U)	84
9. Institute of Aeronautics and Astronautics, Beijing (U)	86

LIST OF ILLUSTRATIONS

Figure 1 Map of Chinese Aviation Industry R&D Facilities (U)	3
Figure 2 Chinese FB-7 Fighter-Bomber Aircraft (U)	6
Figure 3 Chinese L-8 Trainer Aircraft Model (U)	7
Figure 4 Chinese Military Product R&D Structure (U)	9
Figure 5 Chinese Aviation Weapons Development Process (U)	10
Figure 6 Institute of Aviation Research and Design, Shenyang (U)	17
Figure 7 China Helicopter Research and Design Institute, Jingdezhen (U)	20
Figure 8 Bomber Aircraft Research and Design Institute, Xian (U)	22
Figure 9 Fighter Aircraft Design Institute, Chengdu (U)	24
Figure 10 Airframe Plant 320, Nanchang (U)	26
Figure 11 Transport Aircraft Design Institute, Shanghai (U)	28
Figure 12 Institute of Aeronautical Materials, Beijing (U)	31
Figure 13 Aircraft Strength Research Institute, Yaoxian (U)	33
Figure 14 Aircraft Strength Research Institute, Yaoxian (U)	34
Figure 15 Aircraft Thermal Strength Research Institute, Changan (U)	37
Figure 16 Optical and Mechanical Research Institute, Luoyang (U)	42
Figure 17 Institute Aeronautical Radio Electronics, Shanghai (U)	44
Figure 18 Aeroengine Research Institute, Shenyang (U)	49

LIST OF ILLUSTRATIONS (Cont)

	Page
Figure 19 Nanhua Power Plant Research Institute, Zhuzhou (U)	51
Figure 20 Gas Turbine Research Institute, Jiangyou (U)	54
Figure 21 Gas Turbine Research Institute, Jiangyou, (U)	55
Figure 22 Wind Tunnel Research Institute, Shenyang (U)	65
Figure 23 Airframe Plant 122, Harbin (U)	67
Figure 24 Flight Test Research Institute, Xian (U)	70
Figure 25 Seaplane Station, Jingmen (U)	75
Figure 26 Nanjing Aeronautical Institute, Nanjing (U)	82
Figure 27 Northwest Polytechnical University, Xian (U)	85
Figure 28 Beijing Institute of Aeronautics and Astronautics (U)	87

LIST OF TABLES

Table I Chinese Aviation Research Facilities (U)	1
Table II Chinese Airframe-Engine Development Facility Tandems (U)	4
Table III Key Chinese Aeronautical Research Topics (U)	5
Table IV Chinese MAS Avionics Research and Development Organizations (U)	39

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SUMMARY

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SECTION I
INTRODUCTION (U)



TABLE I
(U) CHINESE AVIATION RESEARCH FACILITIES



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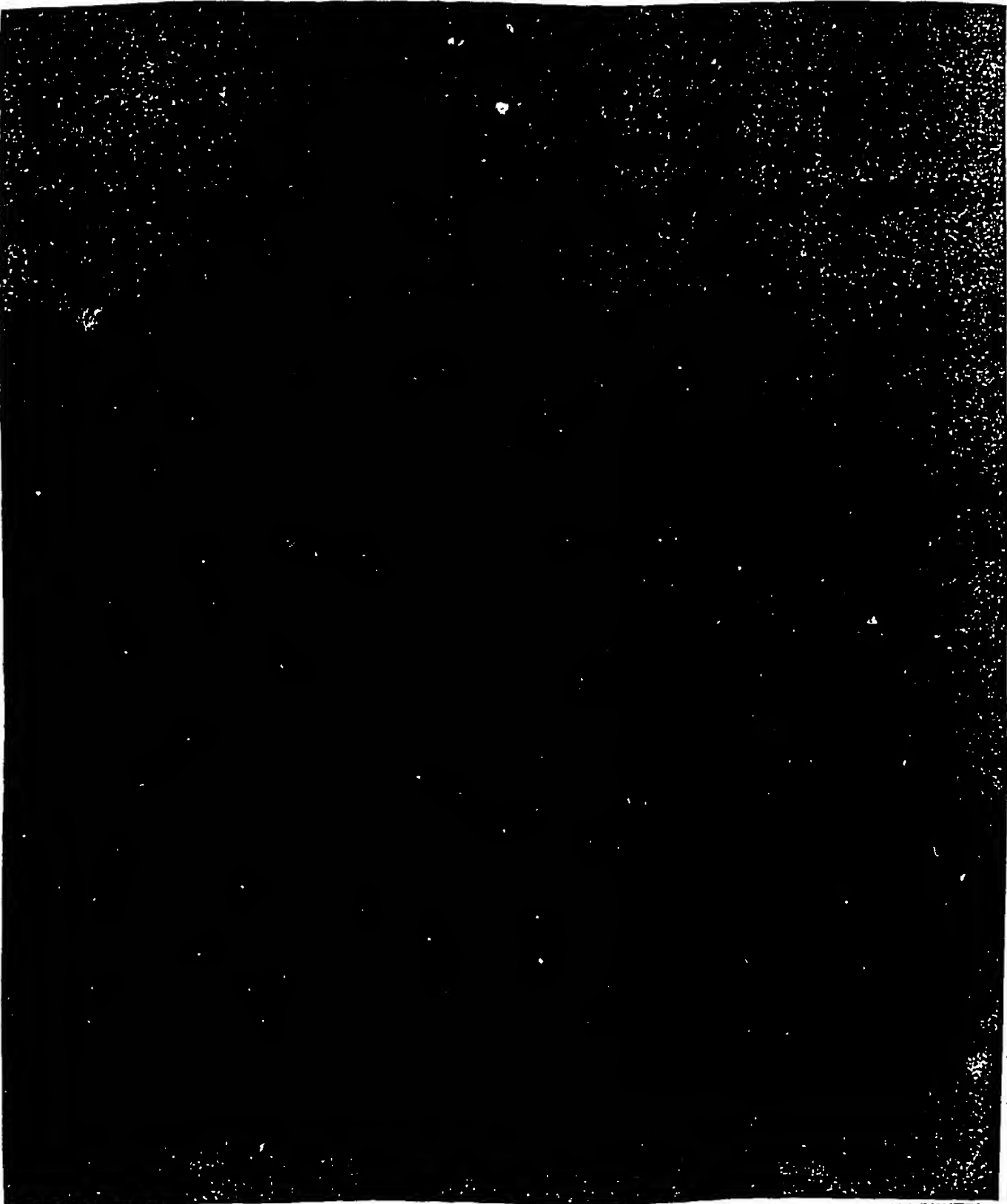
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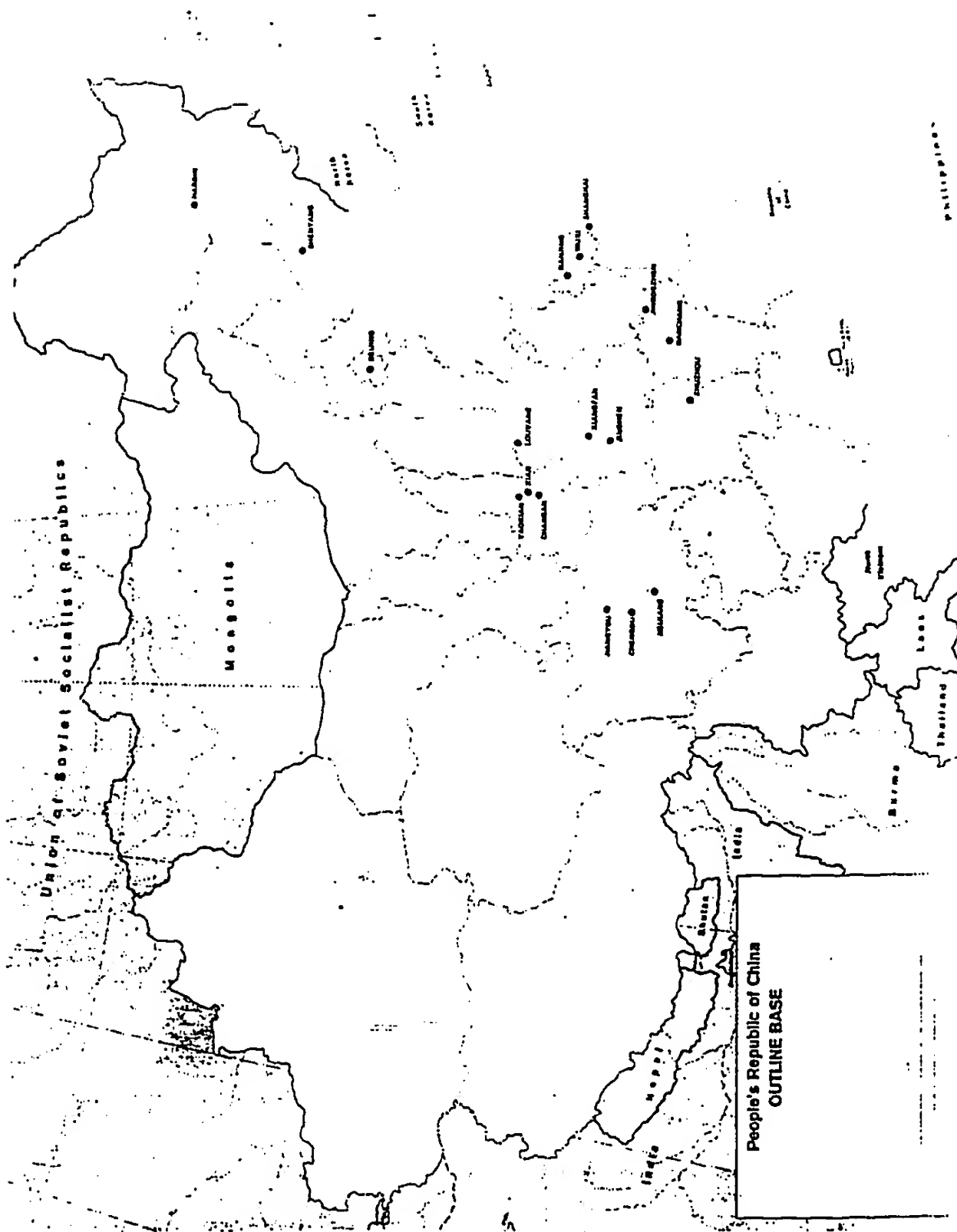
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Fig. 1 (U) Map of Chinese Aviation Industry R&D Facilities

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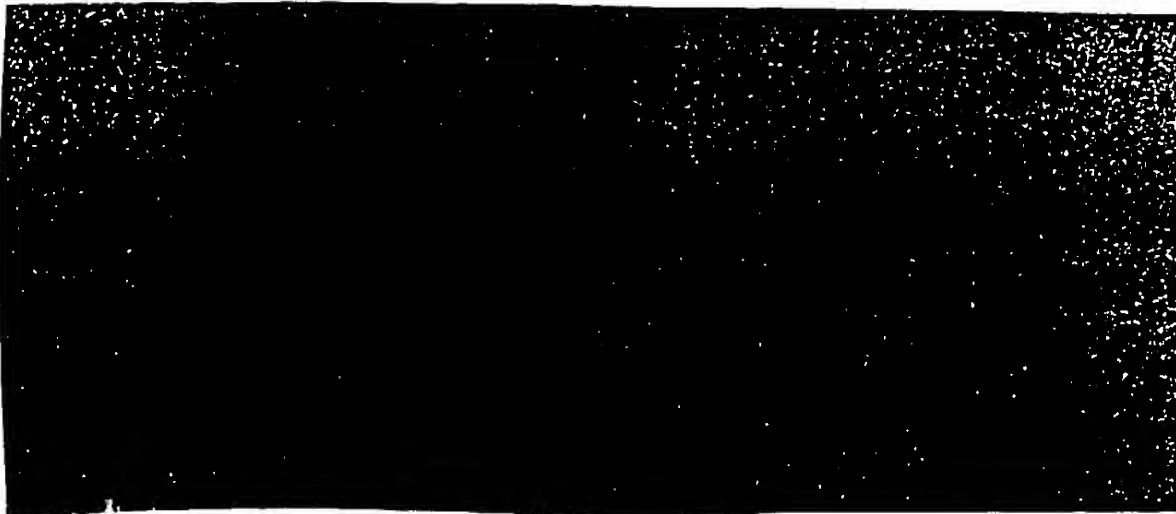
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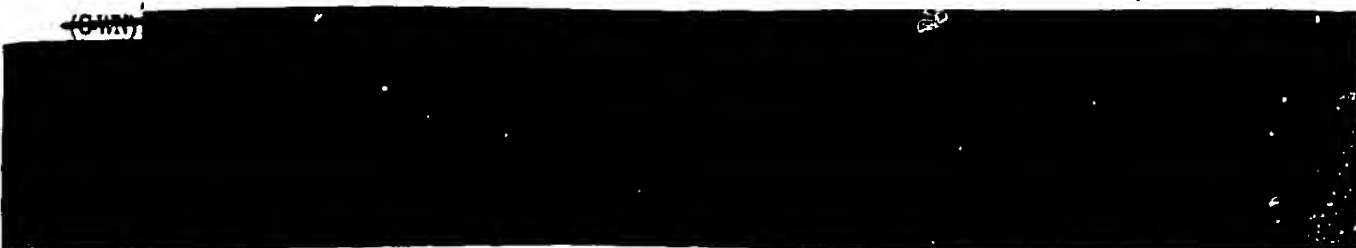
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TABLE II

(U) CHINESE AIRFRAME-ENGINE DEVELOPMENT FACILITY TANDEMS



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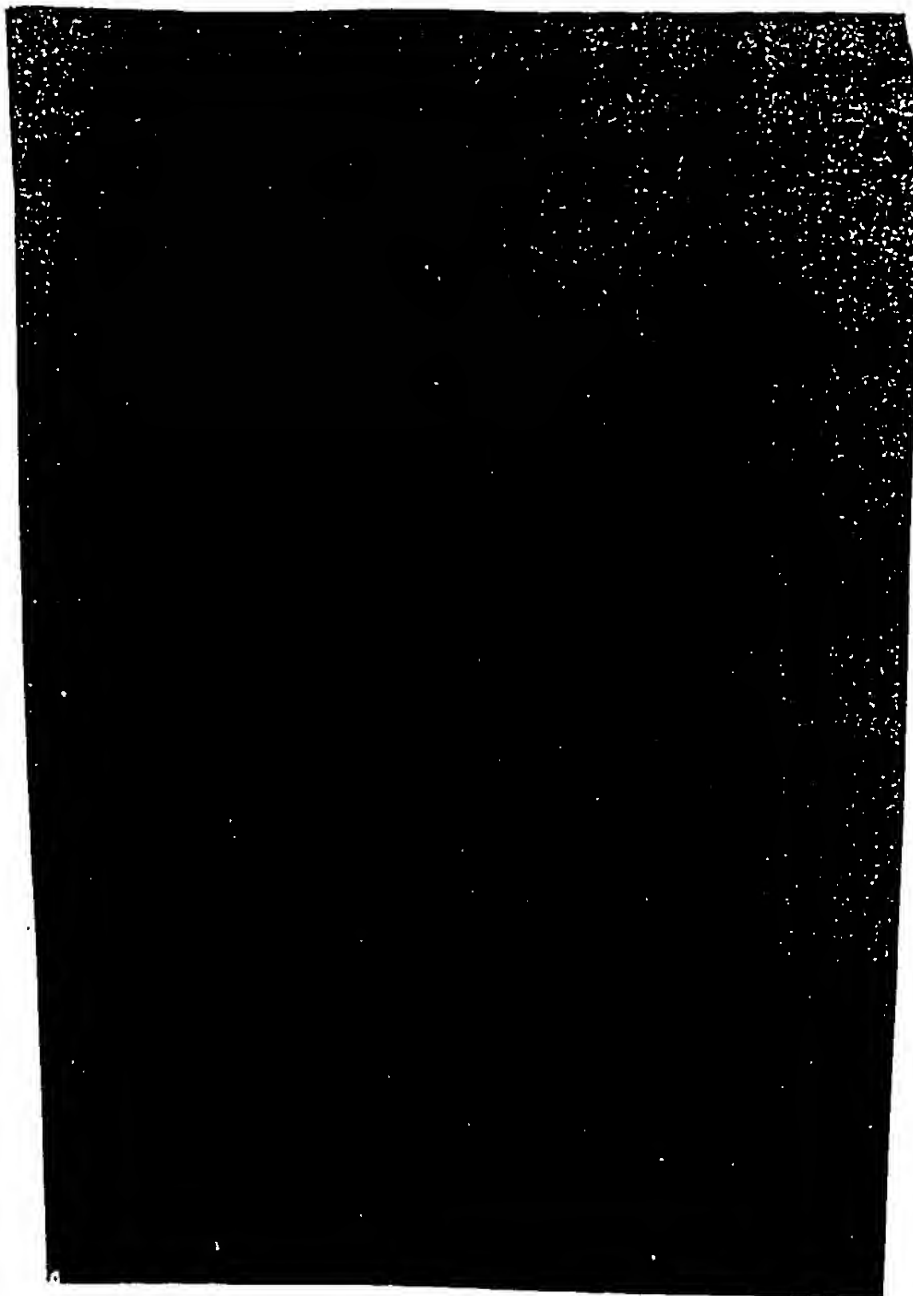
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TABLE III

(U) KEY CHINESE AERONAUTICAL RESEARCH TOPICS



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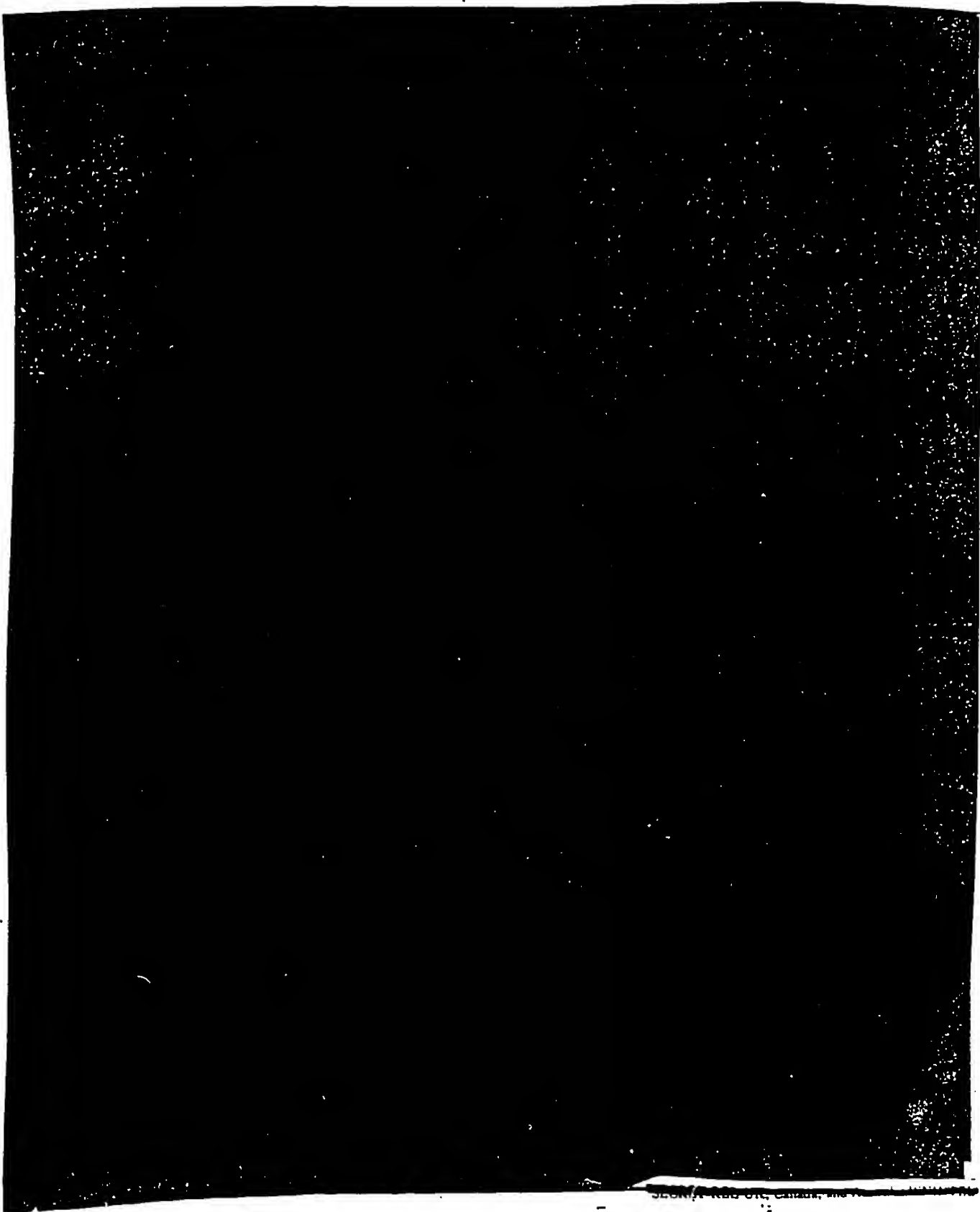


Fig. 2 (U) Chinese FB-7 Fighter-Bomber Aircraft

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Fig. 3 (U) Chinese L-8 Trainer Aircraft Model

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SECTION II

CHINESE AVIATION WEAPONS DEVELOPMENT PROCESS (U)



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Fig. 4--(U) Chinese Military Product R&D Structure

1. Development Process (U)

(U) ~~(S)~~ China's weapons development process involves six phases (Figure 5):

- Theoretical Evaluation (U)
- Program Phase (U)
- Engineering Development (U)
- Design Finalization (U)
- Production Finalization (U)
- Government Approval (U)

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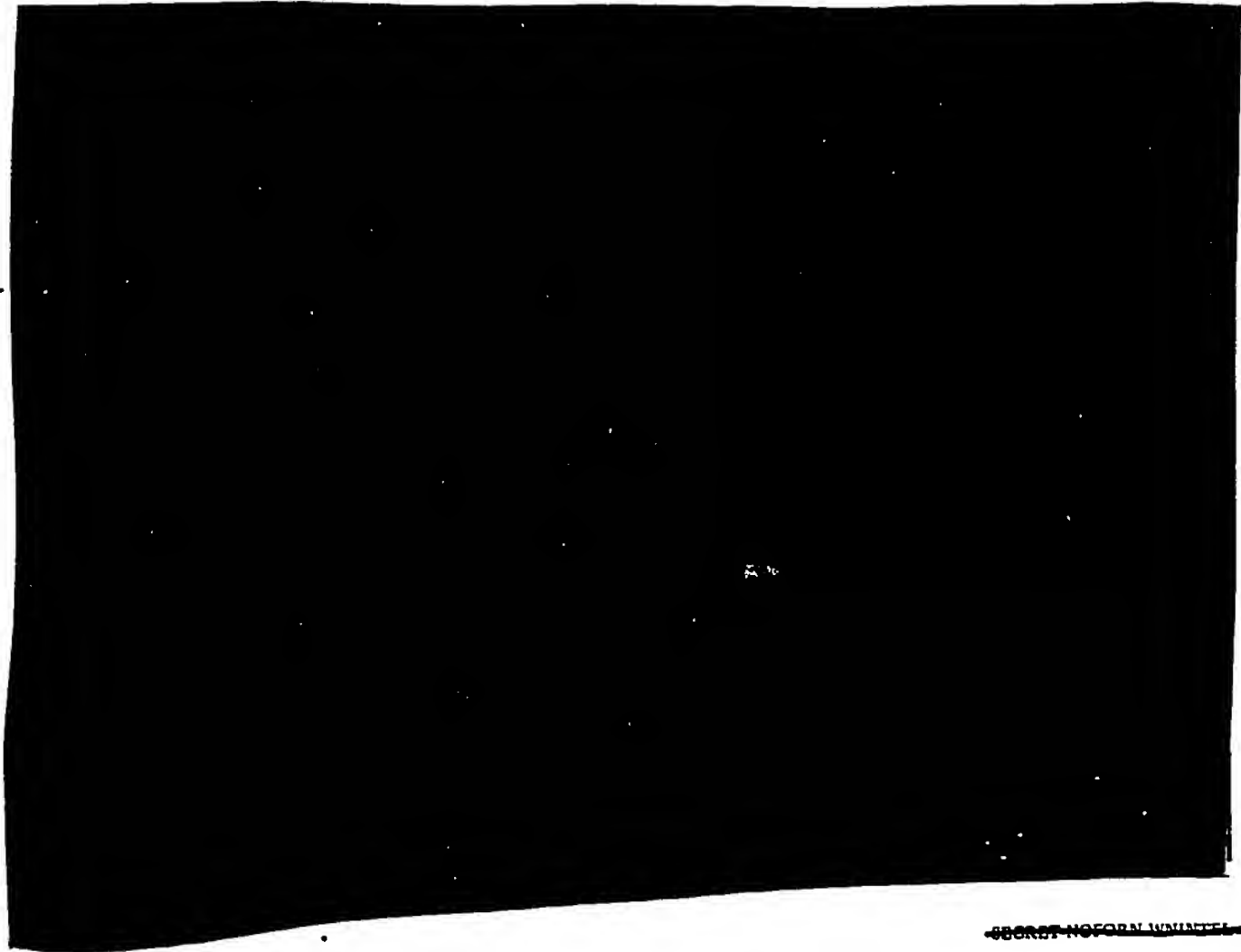
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Fig. 5 (U) Chinese Aviation Weapons Development Process



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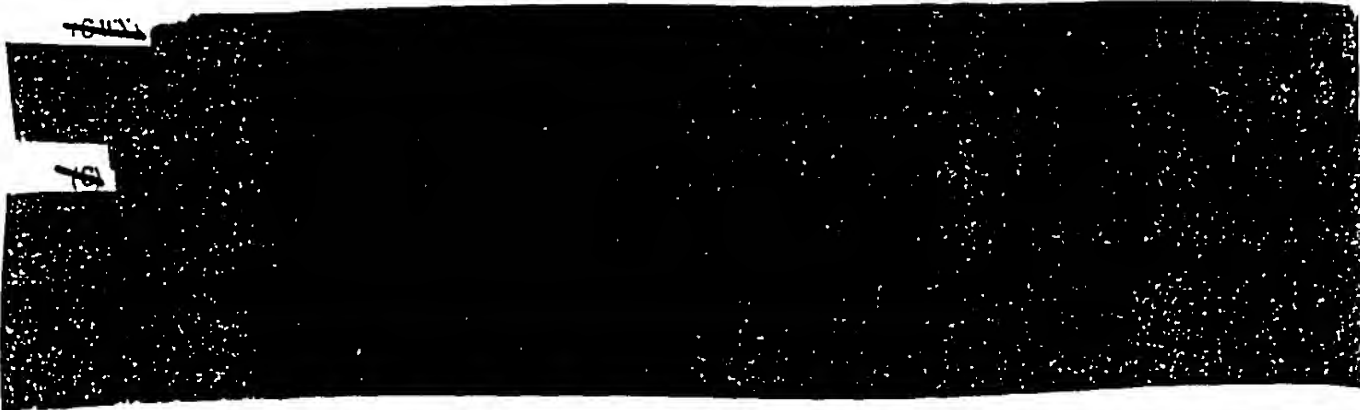
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11 August 1989

1.a. Theoretical Evaluation (U) -

1.a.(1) Project Feasibility Study (U)

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1.a.(2) Design Mission Document (U)

~~(S)~~


1.b. Program Phase (U)

1.b.(1) Request for Proposals and Contractor Selection (U)

(U) This is a very new phase in the Chinese weapons acquisition cycle, and it is not well developed nor understood yet by the Chinese. Prior to this time, COSTIND selected the contractor for a weapon system; now this is being done by the PLAAF.

1.c. Engineering Development (U) ---

1.c.(1) Prototype Development (U)

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1.c.(2) Test and Evaluation (U)

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11 August 1989

1.c.(3) Technology Appraisal (U)

1.d. Design Finalization (U)

1.d.(1) Test and Evaluation (U)

1.d.(2) Finalization Committee (U)

1.e. Production Finalization (U)

1.f. Government Approval (U)

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(U) As major policy decisions in China are the responsibility of the Communist Party leadership, decisions are formalized by decrees and orders, and policy is implemented and administered through and by the State Council. The State Council is, by design, the instrument that translates Party policy decisions into formal, official orders and directives and then administers the execution of work. At this level, the question of which official or ad hoc entity makes the basic policy decisions is largely academic, for, at any given time since the late 1950's, the membership of these groups (and also the Standing Committee of the State Council) has been significantly interlocked. The State Council "signs off" on all of the major policy decisions regarding weapons programs, though that organization probably has a minimum role in the policy-making process.

(U) A number of State agencies have certain responsibilities in weapons program activities. The State Planning Commission (SPC) is involved with military product R&D. It levies requirements for the development of civilian-sector science plans; reviews, revises, and approves these plans; aggregates them into an overall science plan; integrates that plan with general economic planning (e.g., a Five-Year Plan); and allocates funds through the Ministry of Finance. The SPC also integrates defense R&D and industrial plans and budgets into the overall economic plan through its National Defense Bureau.

2. Funding (U)

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SECTION III

AIRCRAFT DESIGN AND DEVELOPMENT FACILITY RESOURCES (U)



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1. Institute of Aviation Research and Design, Shenyang (U)

(U) Alternate Names: 601 Institute; Shenyang Aircraft Research and Development Center

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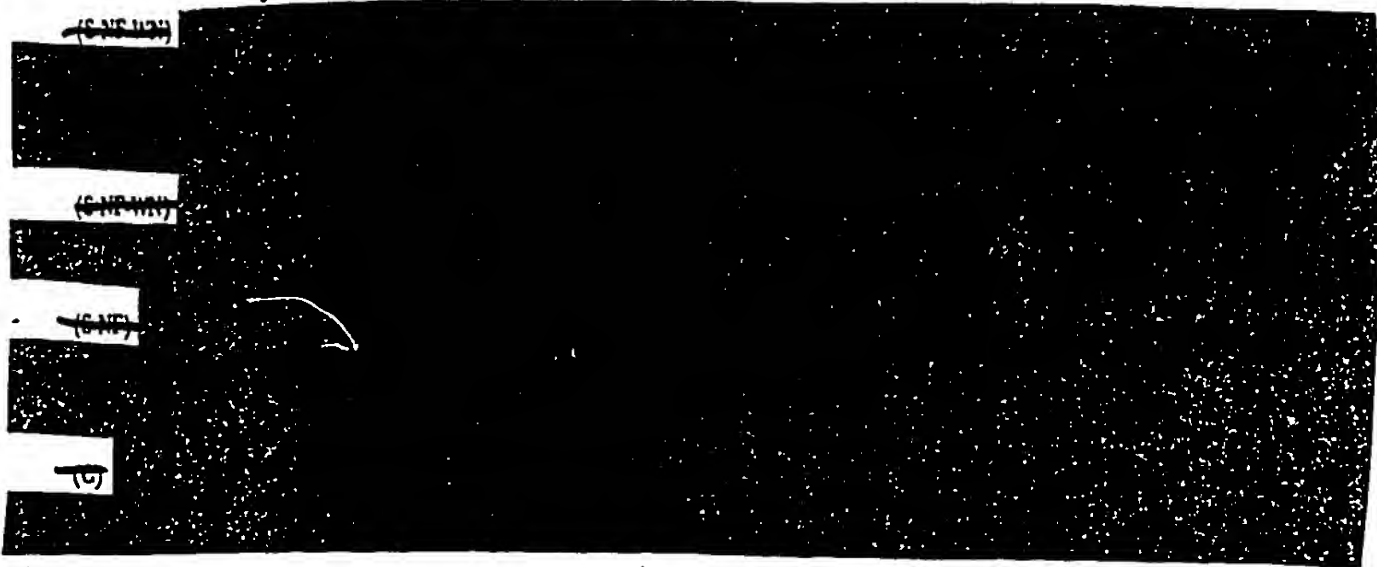
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11 August 1989



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2. Helicopter Research and Design Institute, Jingdezhen (U)

(U) Alternate Name: 602 Research Institute

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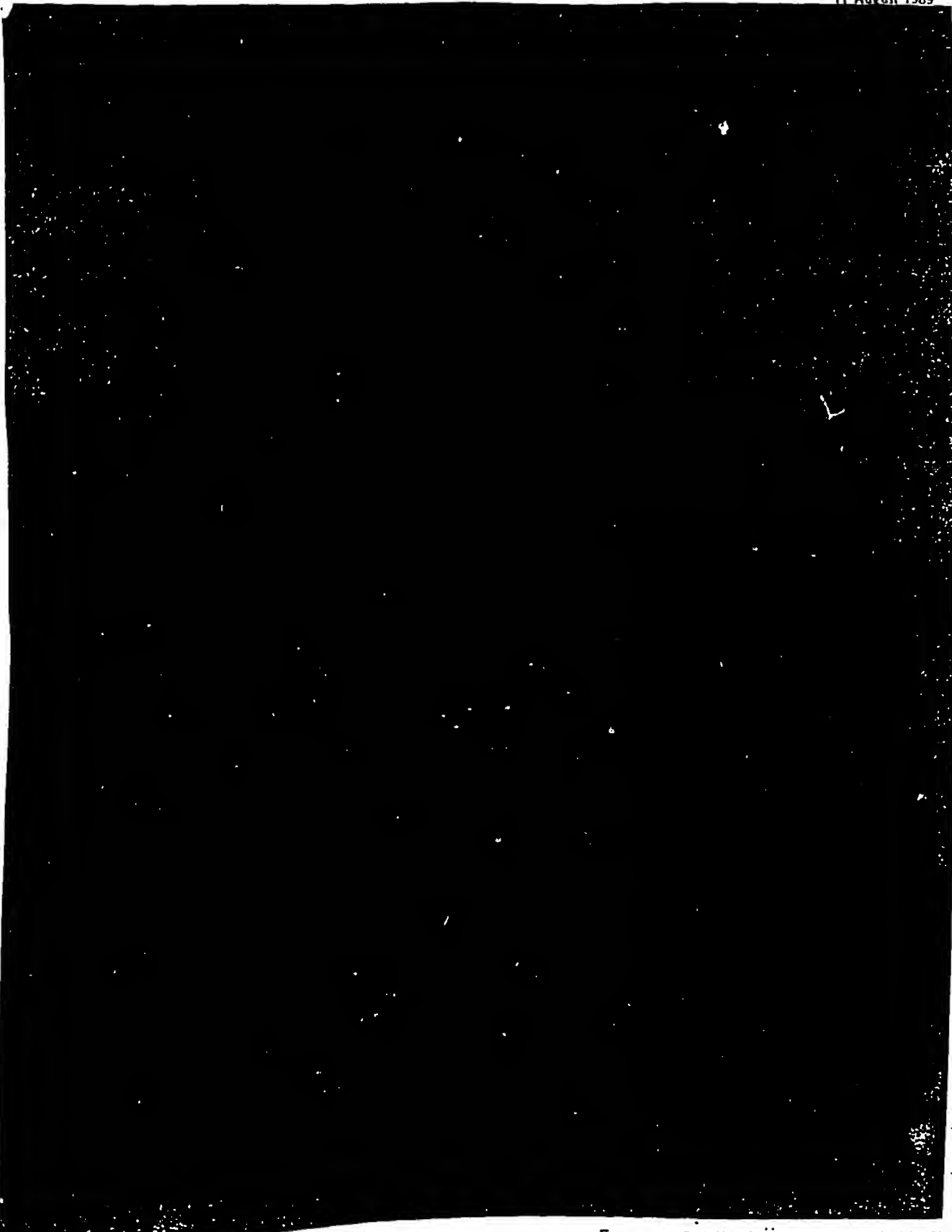
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Fig. 7 (U) China Helicopter Research and Design Institute, Jingdezhen

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3. Bomber Aircraft Research and Design Institute, Xian (U)

(U) Alternate Name: 603 Research Institute

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(U) The institute has received approval from the State Education Commission to solicit applicants for a masters degree program. The courses offered include Structural Fatigue of Aircraft and Integral Design of Aircraft.

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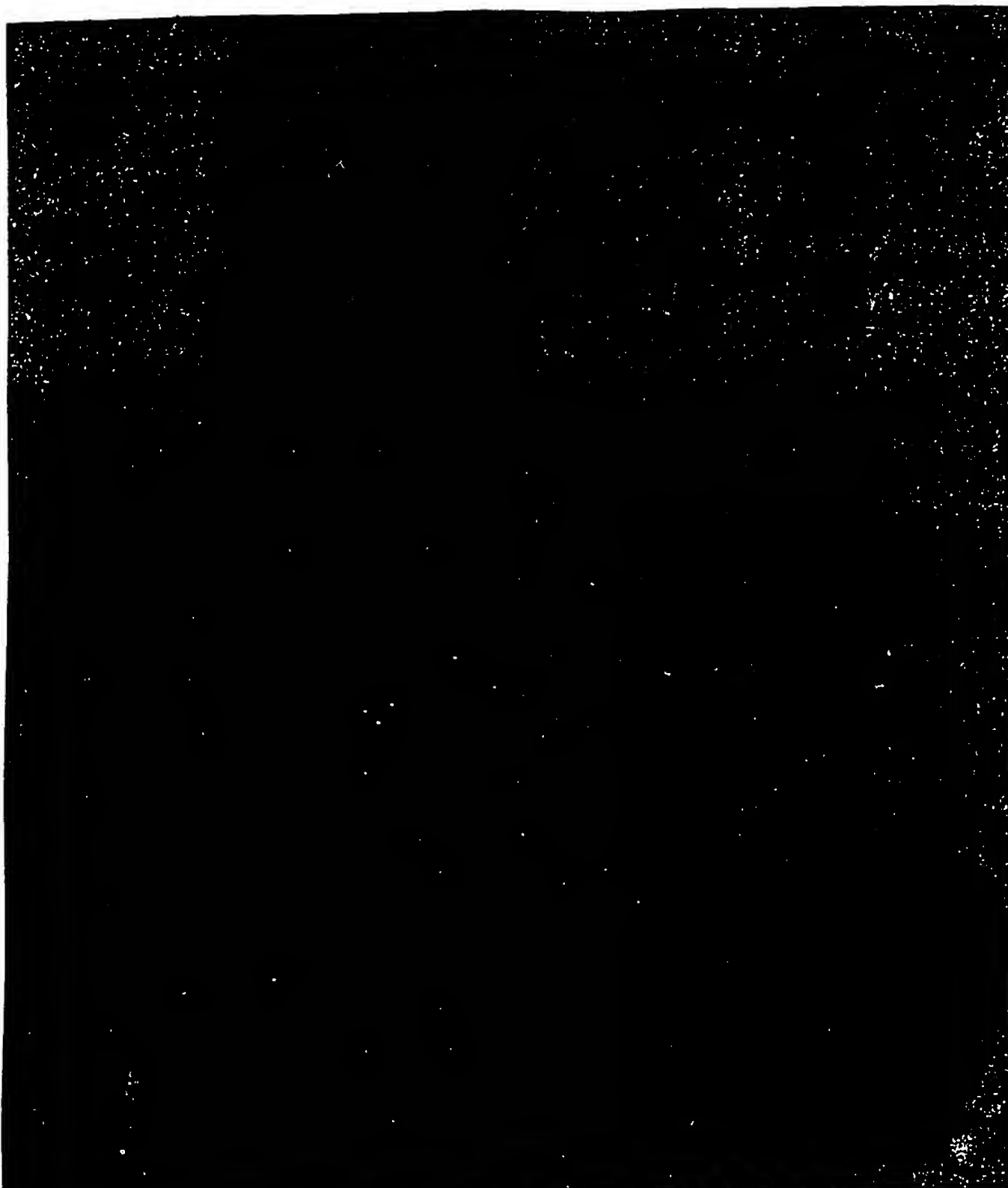
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Fig. 8 (U) Bomber Aircraft Research and Design Institute, Xian

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11 August 1989

4. Fighter Aircraft Design Institute, Chengdu (U)

(U) Alternate Name: 611 Research Institute

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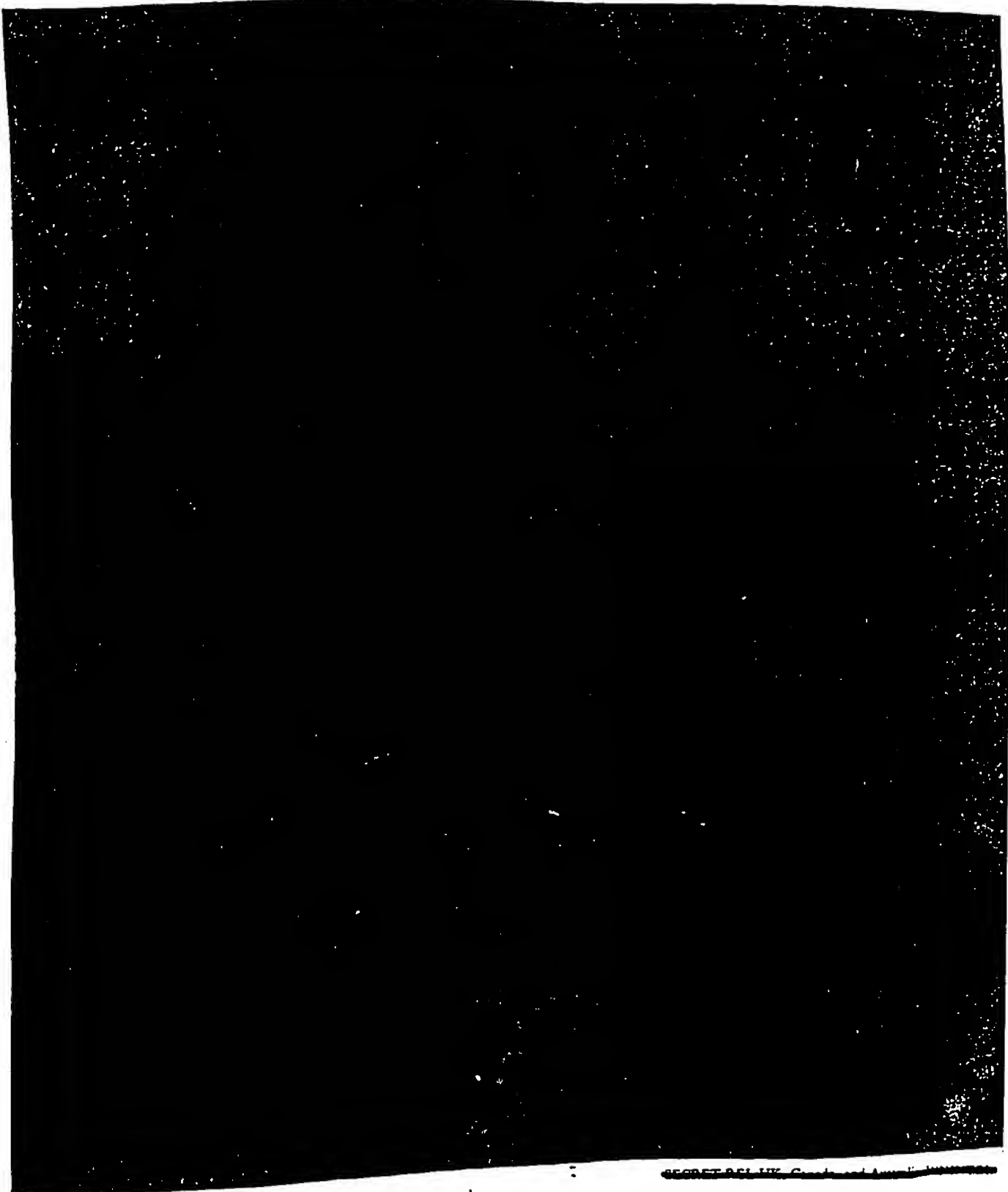


Fig. 9 (U) Fighter Aircraft Design Institute, Chengdu

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5. Research Institute, Nanchang (U).

(U) Alternate Name: N/A

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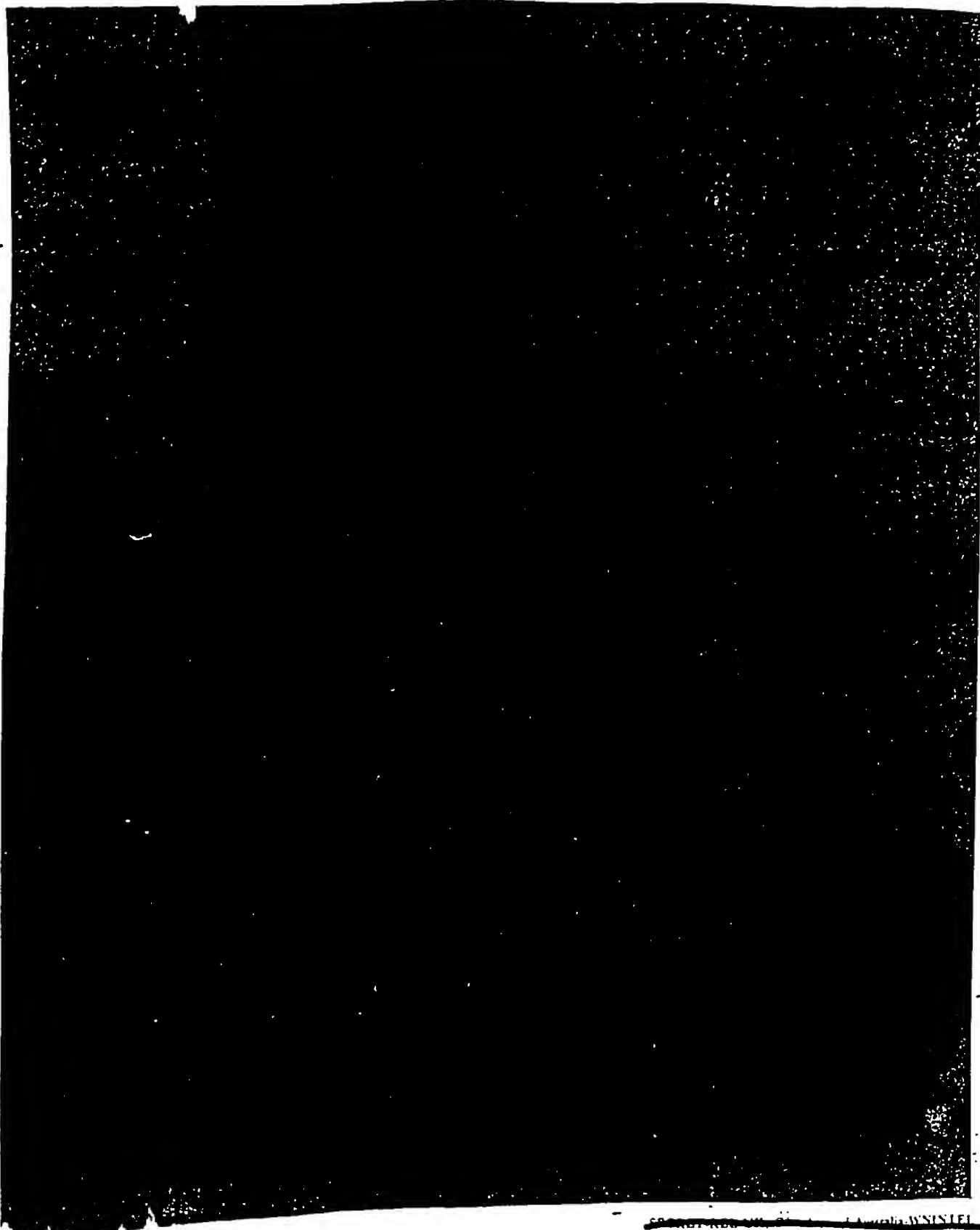


Fig. 10 (U) Airframe Plant 320, Nanchang

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6. Transport Aircraft Design Institute, Shanghai (U)

(U) Alternate Name: 640 Institute, Shanghai

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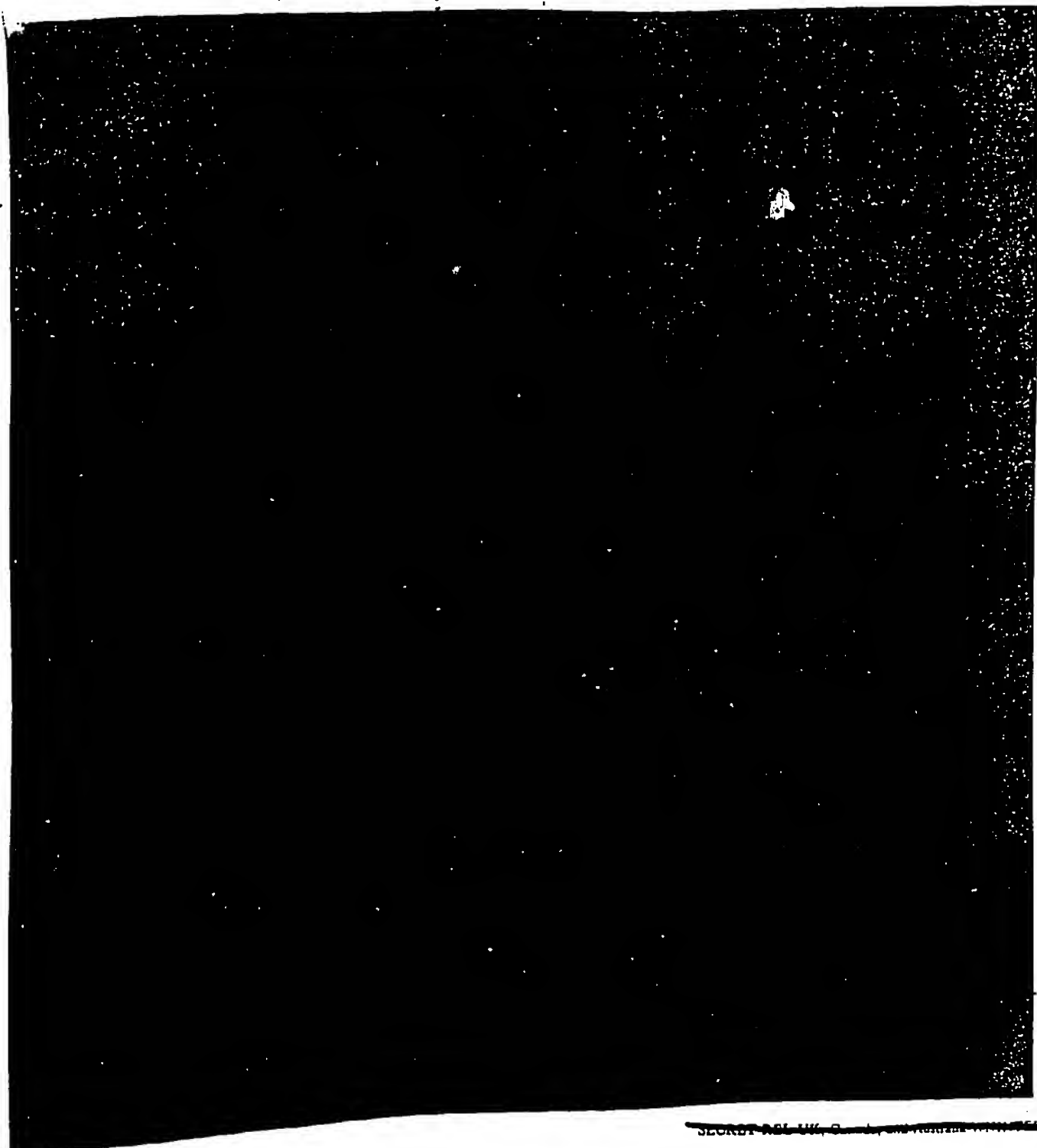


Fig. 11 (U) Transport Aircraft Design Institute, Shanghai

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SECTION IV

AIRCRAFT MATERIALS AND STRUCTURES FACILITY RESOURCES (U)



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1. Institute of Aeronautical Materials, Beijing (U)

(U) Alternate Name: 621 Institute

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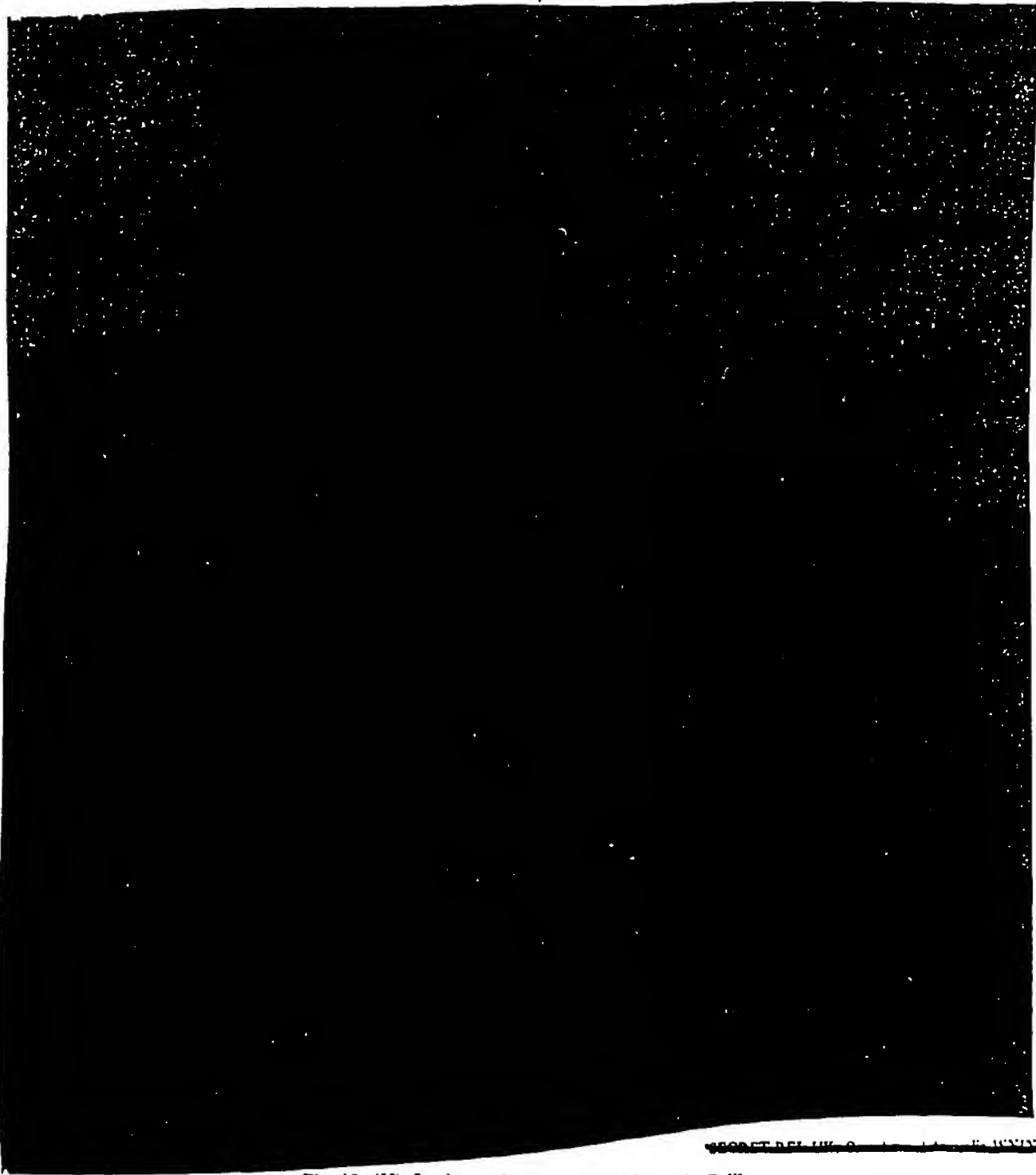


Fig. 12 (U) Institute of Aeronautical Materials, Beijing

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2. Aircraft Strength Research Institute, Yaoxian (U)

(U) Alternate Name: 623 Institute

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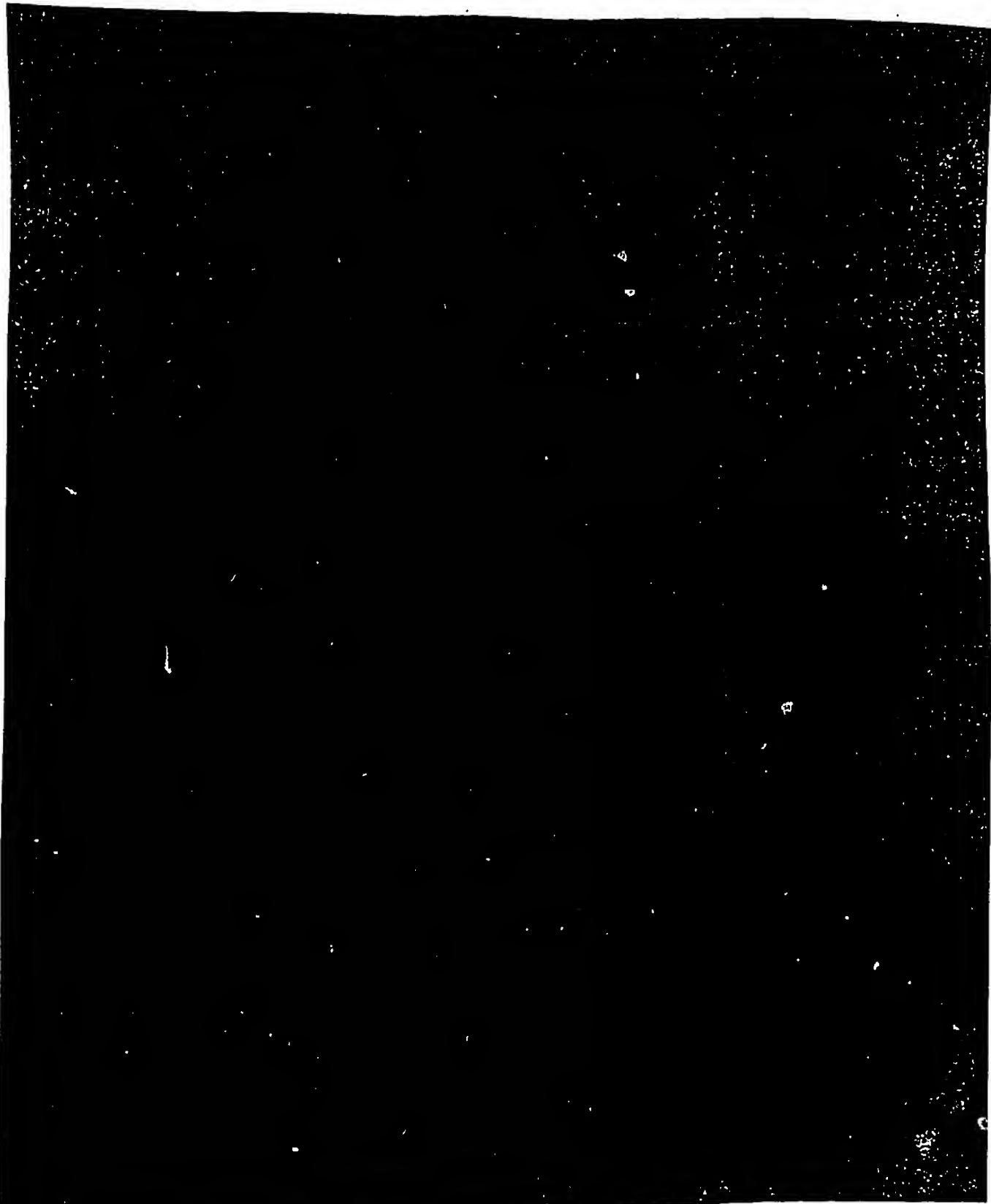


Fig. 13 (U) Aircraft Strength Research Institute, Yaoxian

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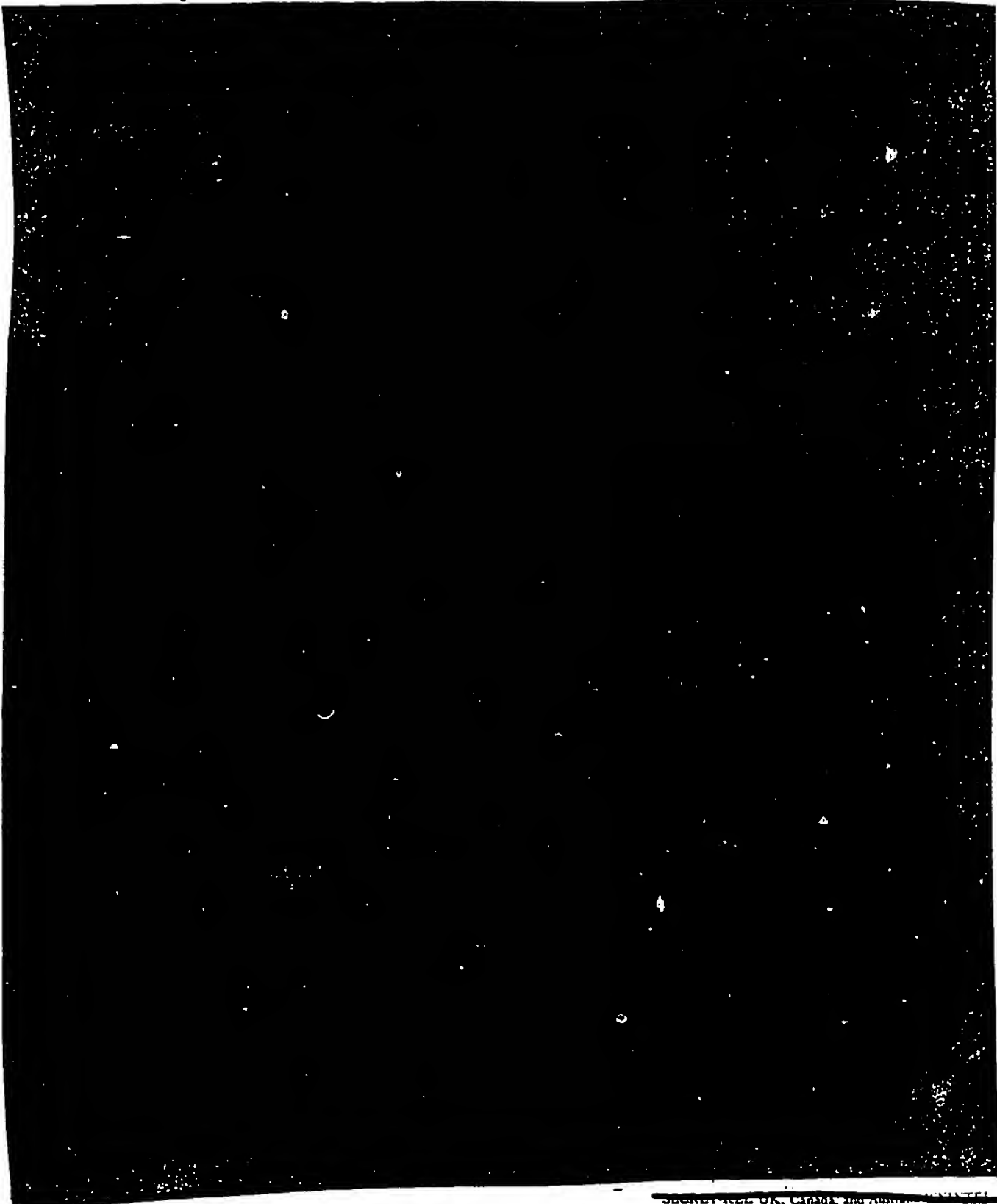


Fig. 14 (U) Aircraft Strength Research Institute, Yaoxian

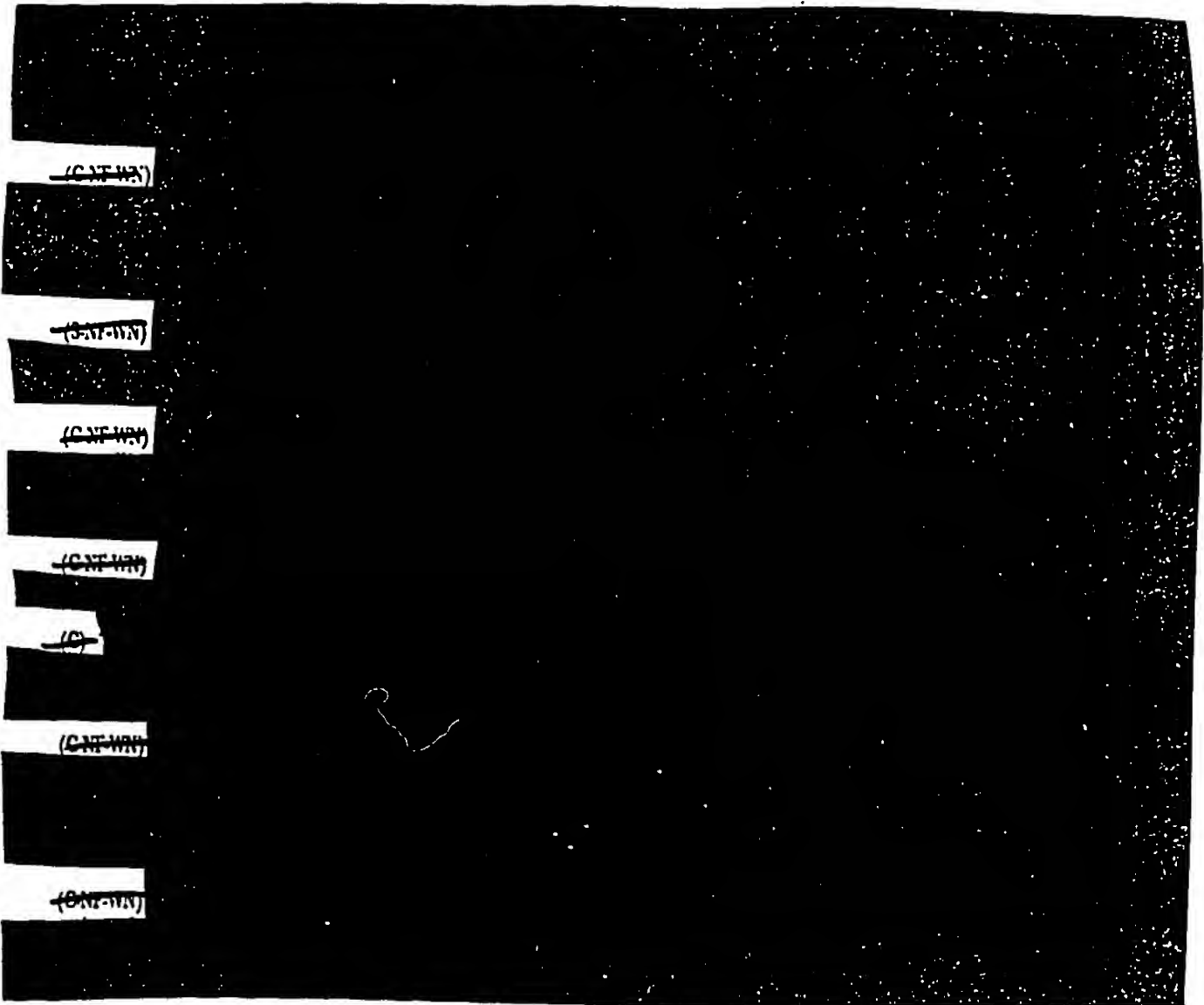
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3. Aircraft Thermal Strength Research Institute, Changan (U)

(U) Alternate Name: 629 Institute

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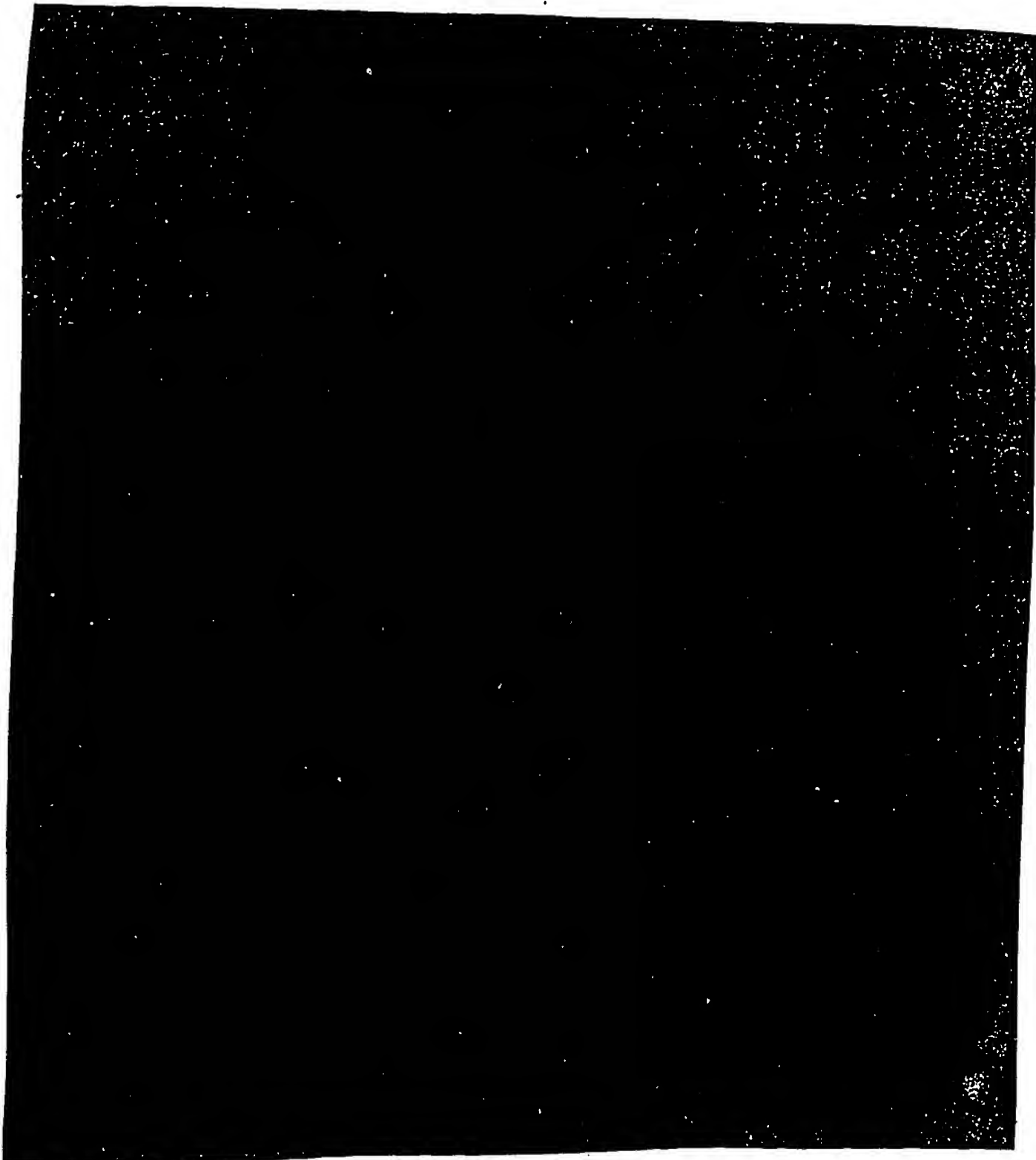


Fig. 15 (U) Aircraft Thermal Strength Research Institute, Changan

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4. Aeronautical Manufacturing Technology Research Institute, Beijing (U)

(U) Alternate Name: 625 Institute

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(U) The institute also is involved in post-graduate education. It has offered courses in adhesive technology, power spinning of aircraft parts, welding, and nondestructive testing of aircraft structural adhesives.

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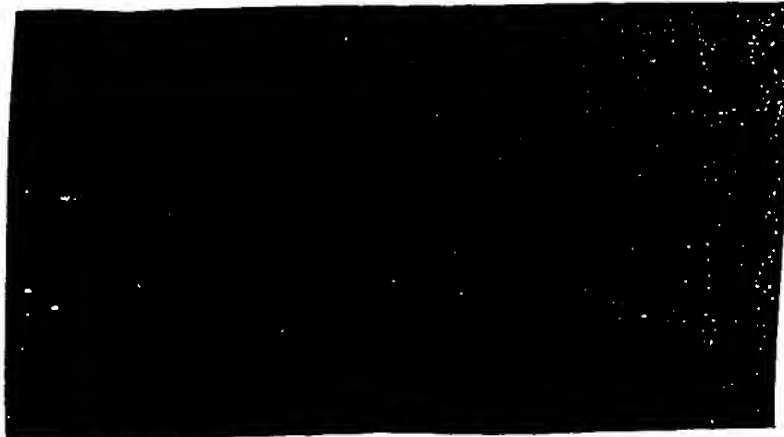
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AVIONICS DESIGN AND DEVELOPMENT FACILITY RESOURCES (U)



TABLE IV

(U) CHINESE MAS AVIONICS RESEARCH AND
DEVELOPMENT ORGANIZATIONS



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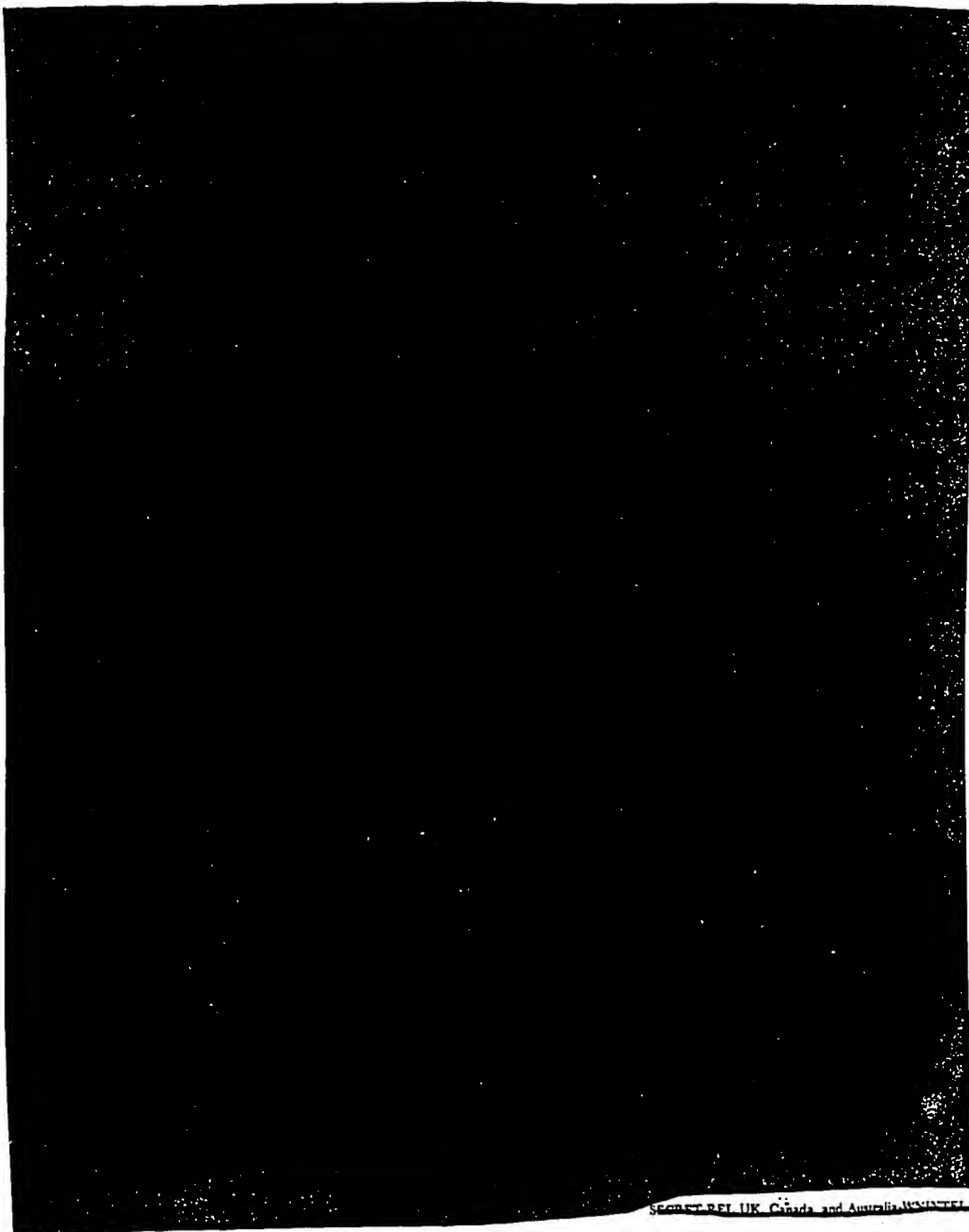


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Fig. 16 (U) Optical and Mechanical Research Institute, Luoyang

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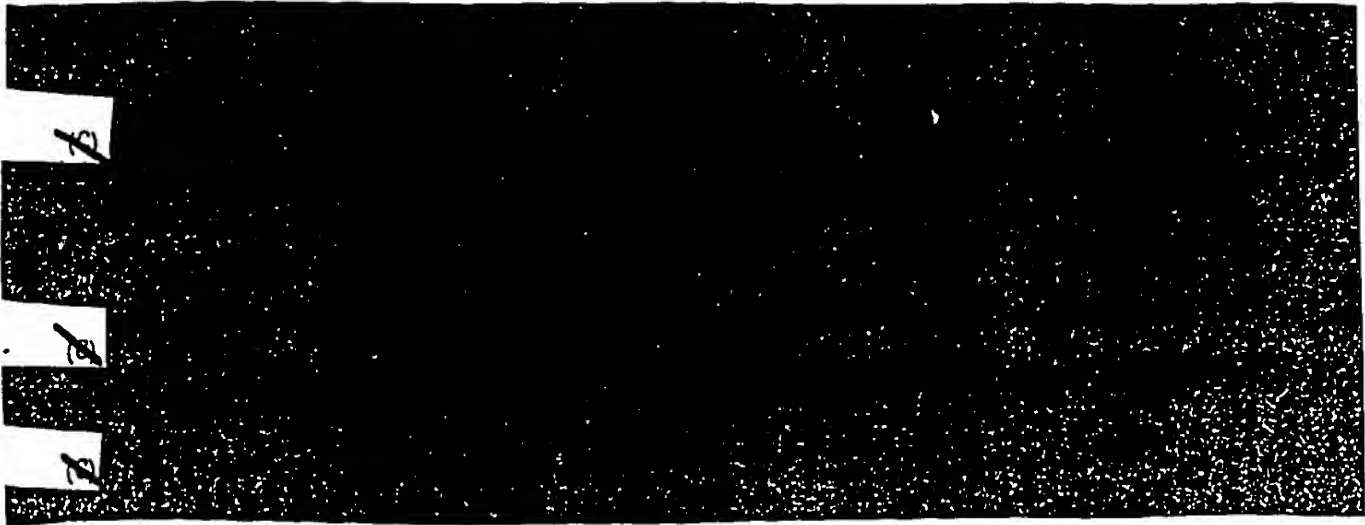
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3. Institute of Aeronautical Radio Electronics, Shanghai (U)

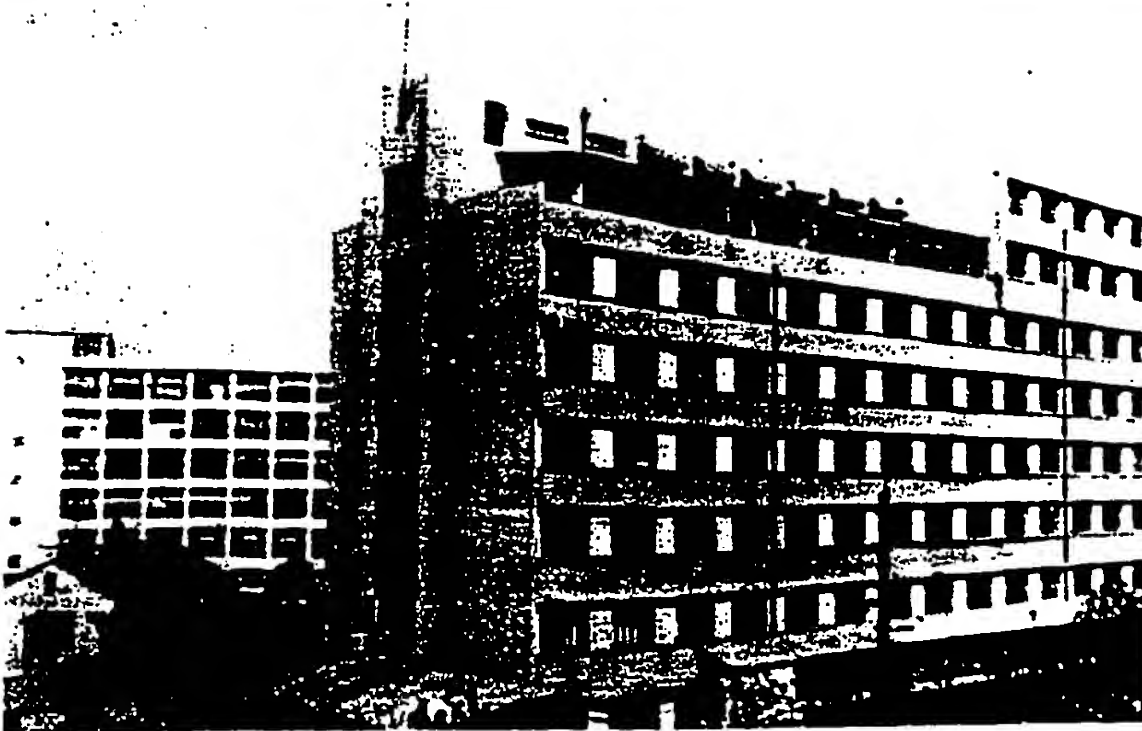
(U) Alternate Name: 615 Research Institute

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Fig. 17 (U) Institute of Aeronautical Radio Electronics, Shanghai

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11 August 1989

5. Aeronautical Computer Technology Research Institute, Xian (U)

(U) Alternate Name: 631 Research Institute

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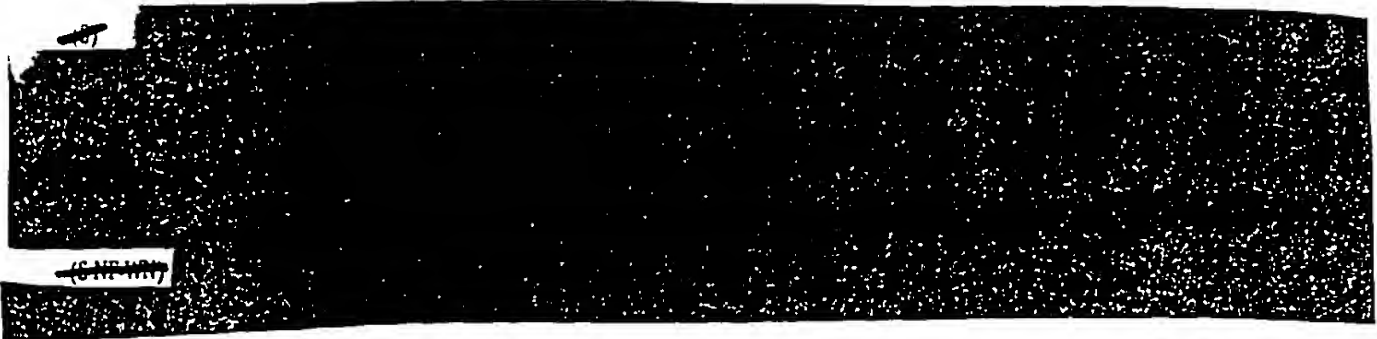
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SECTION VI

AIRCRAFT PROPULSION FACILITY RESOURCES (U)



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I. Aeroengine Research Institute, Shenyang (U)

(U) Alternate Names: 606 Research Institute

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(U) Coordinates: 41°51' N/123°41' E

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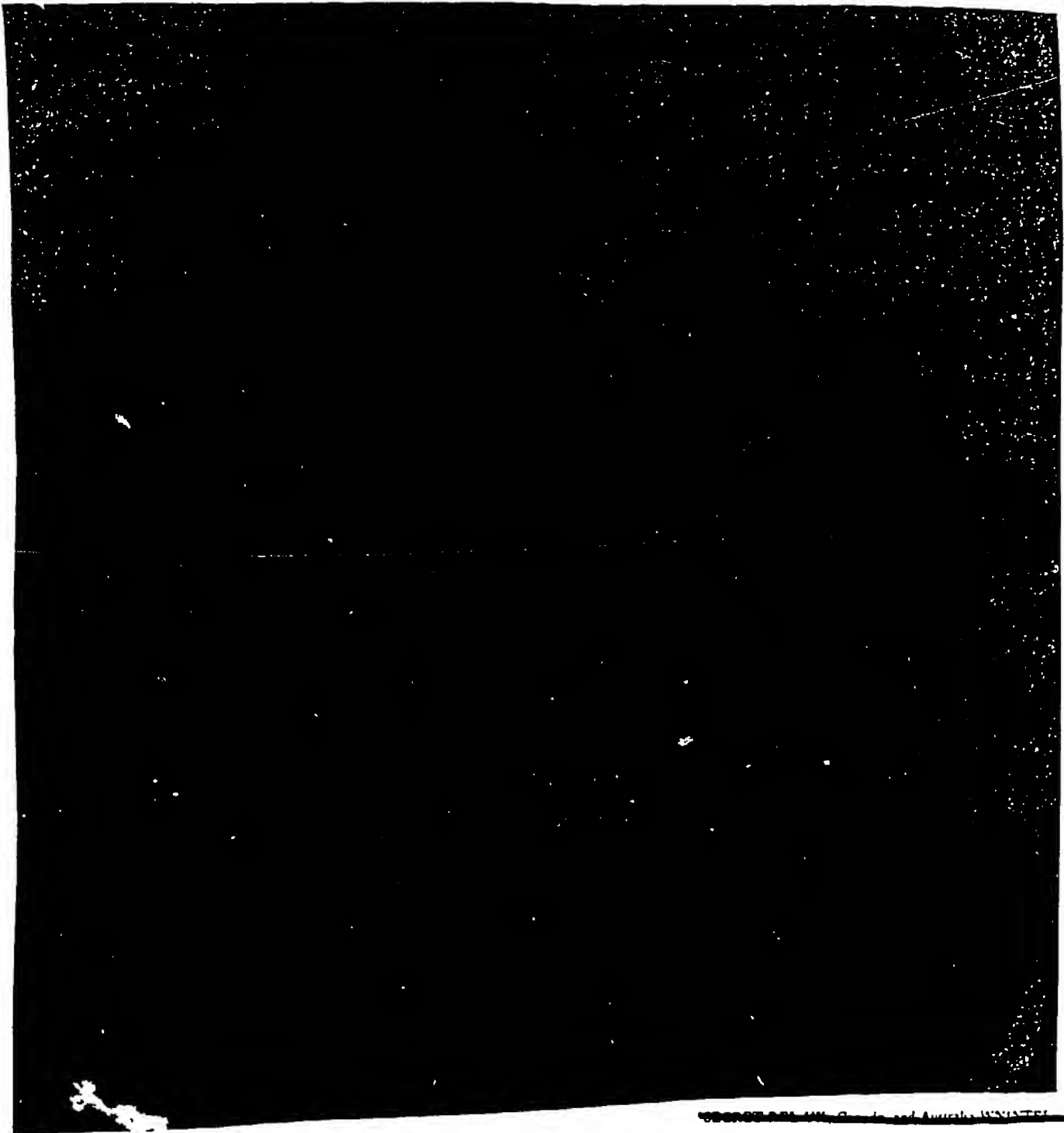


Fig. 18 (U) Aeroengine Research Institute, Shenyang

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2. Nanhua Power Plant Research Institute, Zhuzhou (U)

(U) Alternate Name: 608 Research Institute

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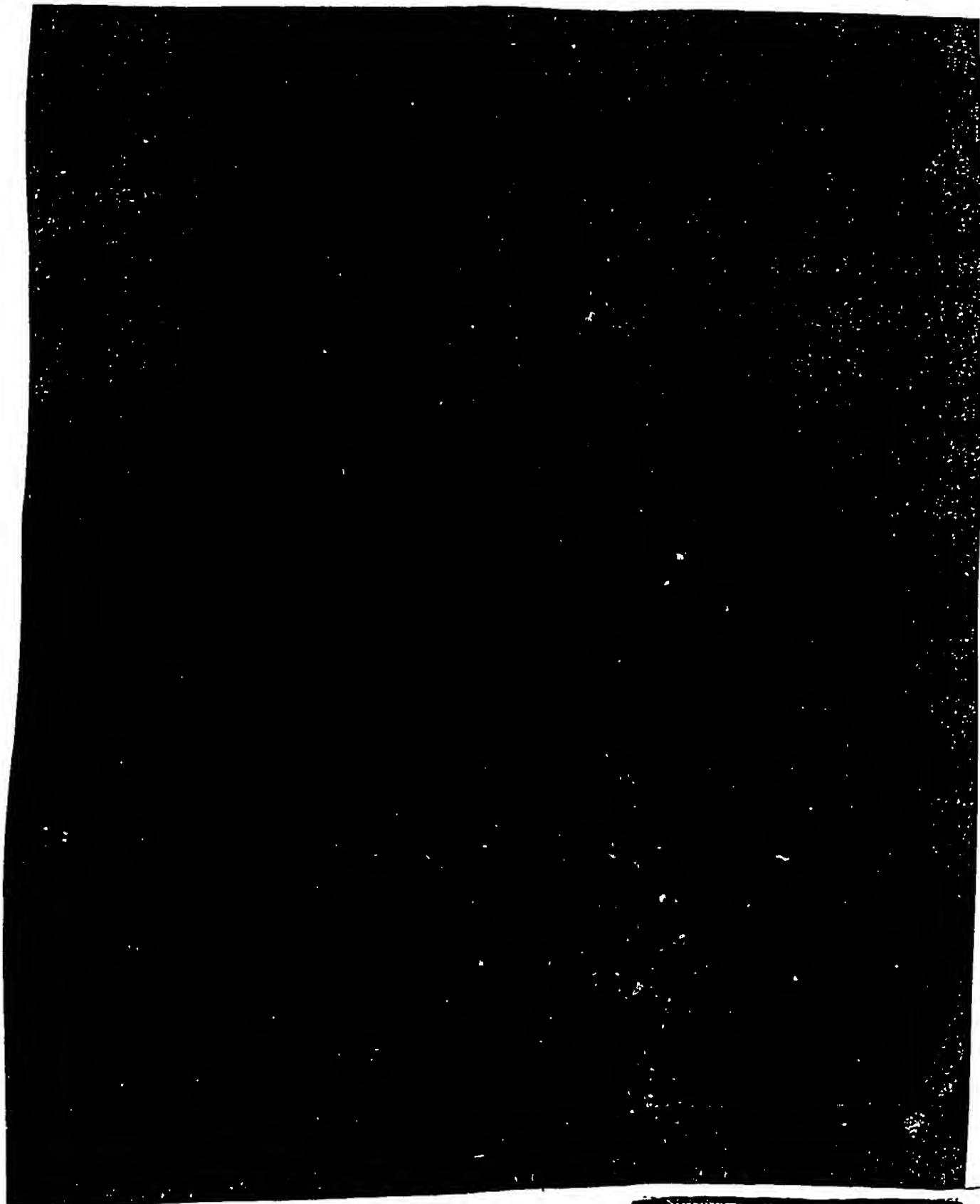


Fig. 19 (U) Nanhua Power Plant Research Institute, Zhuzhou

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3. Aircraft Engine Research Institute, Wuxi (U)

(U) Alternate Name: 614 Research Institute

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4. Gas Turbine Research Institute, Jiangyou (U)

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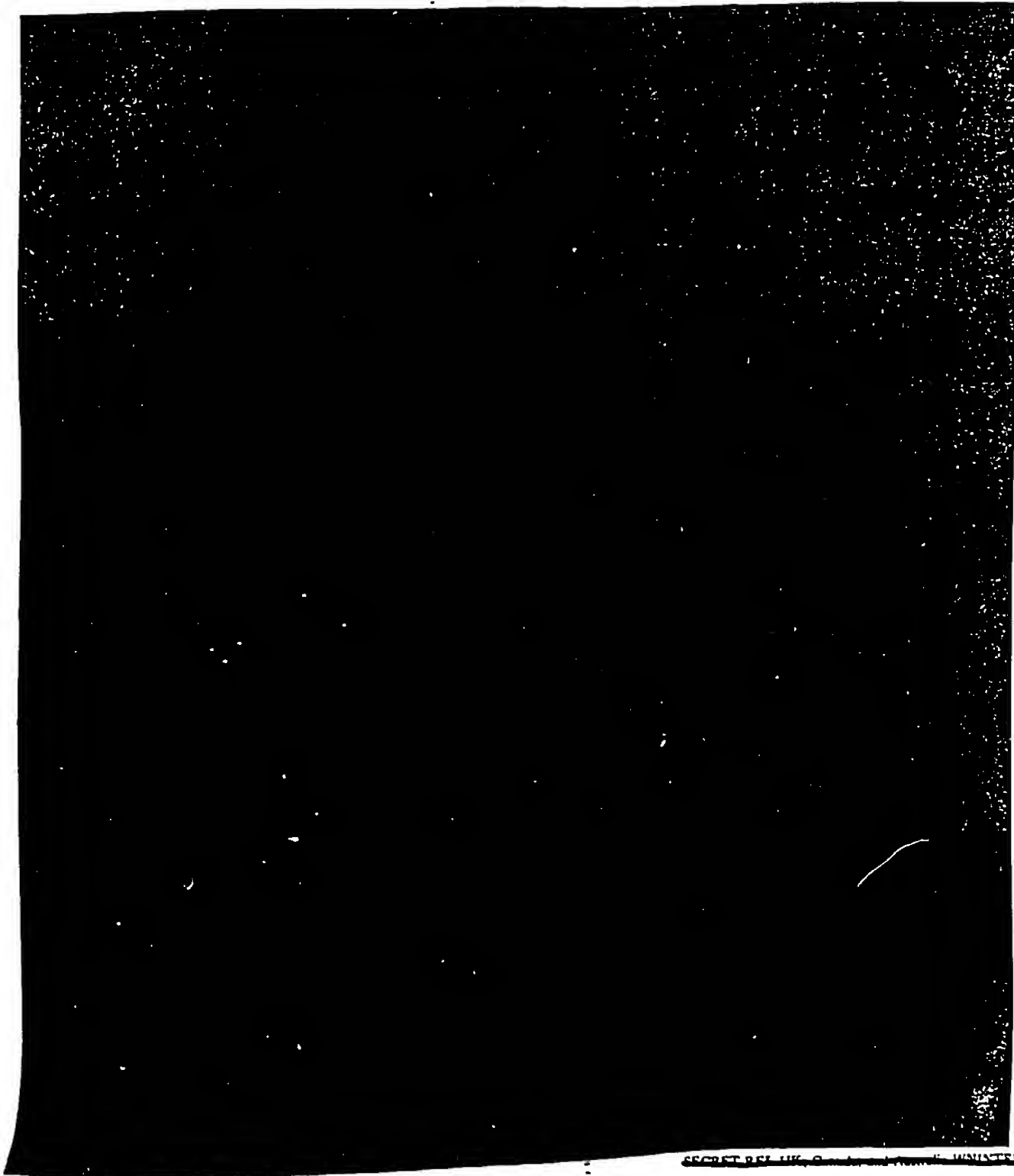


Fig. 20 (U) Gas Turbine Research Institute, Jiangyou

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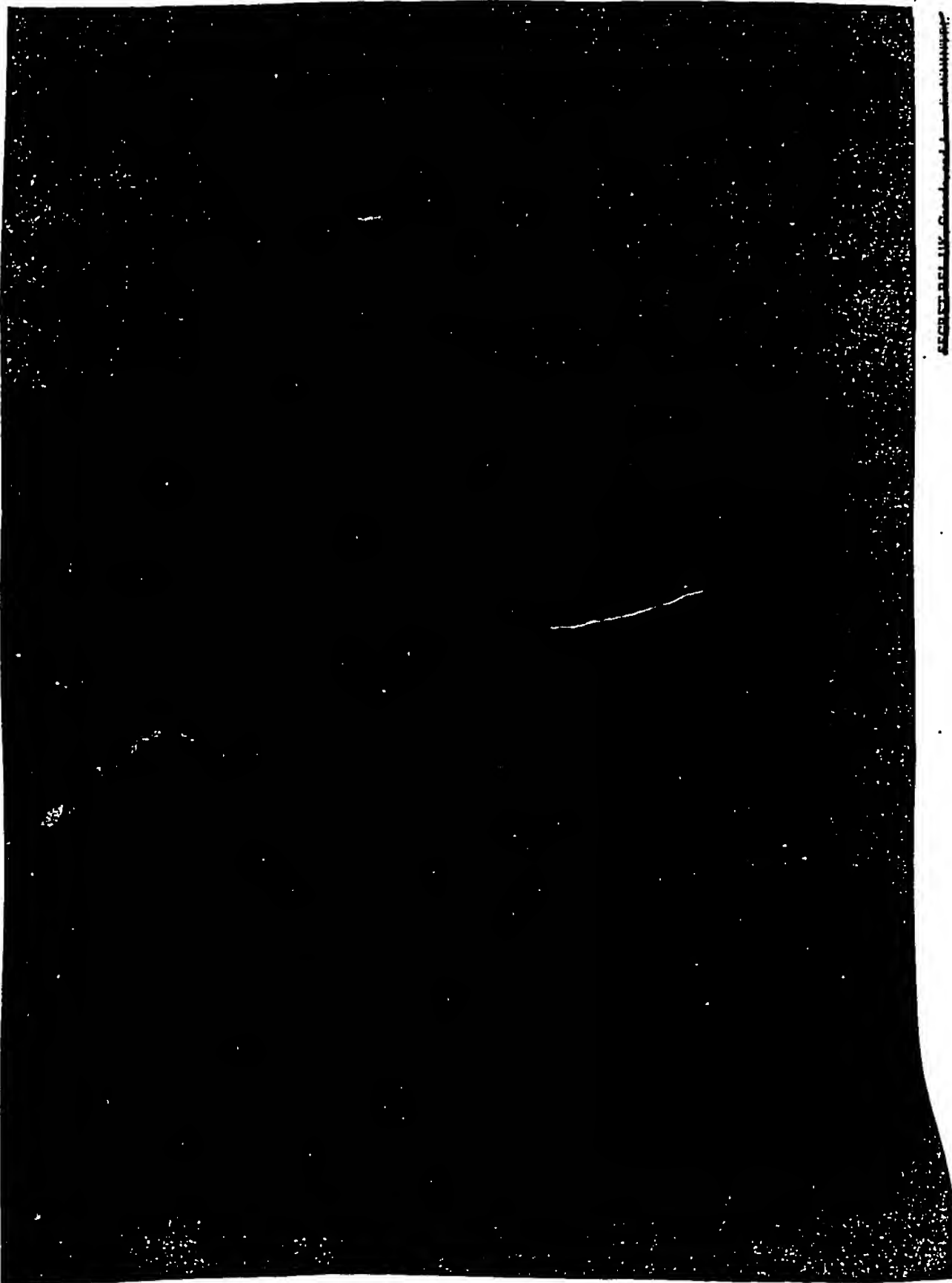


Fig. 21 (U) Gas Turbine Research Institute, Jiangyou

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SECTION VII

ENVIRONMENTAL CONTROLS AND CREW ESCAPE SYSTEMS (U)



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1. Research Institute of Aircraft Accessories, Xiangfan (U)

(U) Alternate Name: 609 Research Institute

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2. Aero Rescue Systems Research Institute, Xiangfan (U)

(U) Alternate Name: 610 Research Institute

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SECTION VIII

AIR-TO-AIR MISSILE DEVELOPMENT FACILITIES (U)



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1. Air-to-Air Missile Dynamics Research Institute, Luoyang (U)

(U) Alternate Name: 612 Research Institute

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SECTION IX

WIND TUNNEL TEST SUPPORT FACILITIES (U)



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1. Wind Tunnel Research Institute, Shenyang (U)

(U) Alternate Names: 626 Research Institute; Shenyang Aerodynamic Research Institute (SARI)

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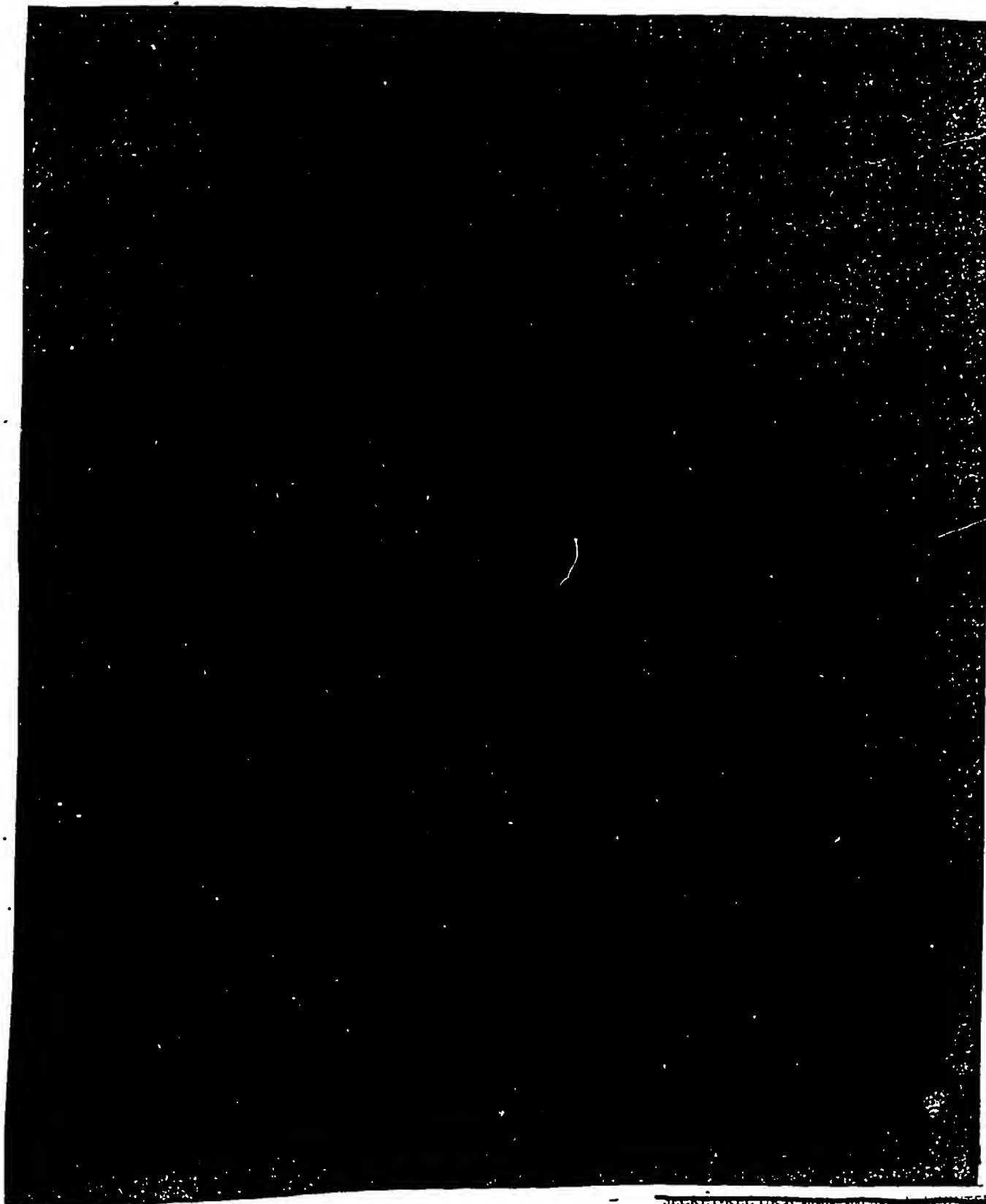


Fig. 22 (U) Wind Tunnel Research Institute, Shenyang

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2. Institute of Aerodynamics, Harbin (U)

(U) Alternate Name: 627 Research Institute

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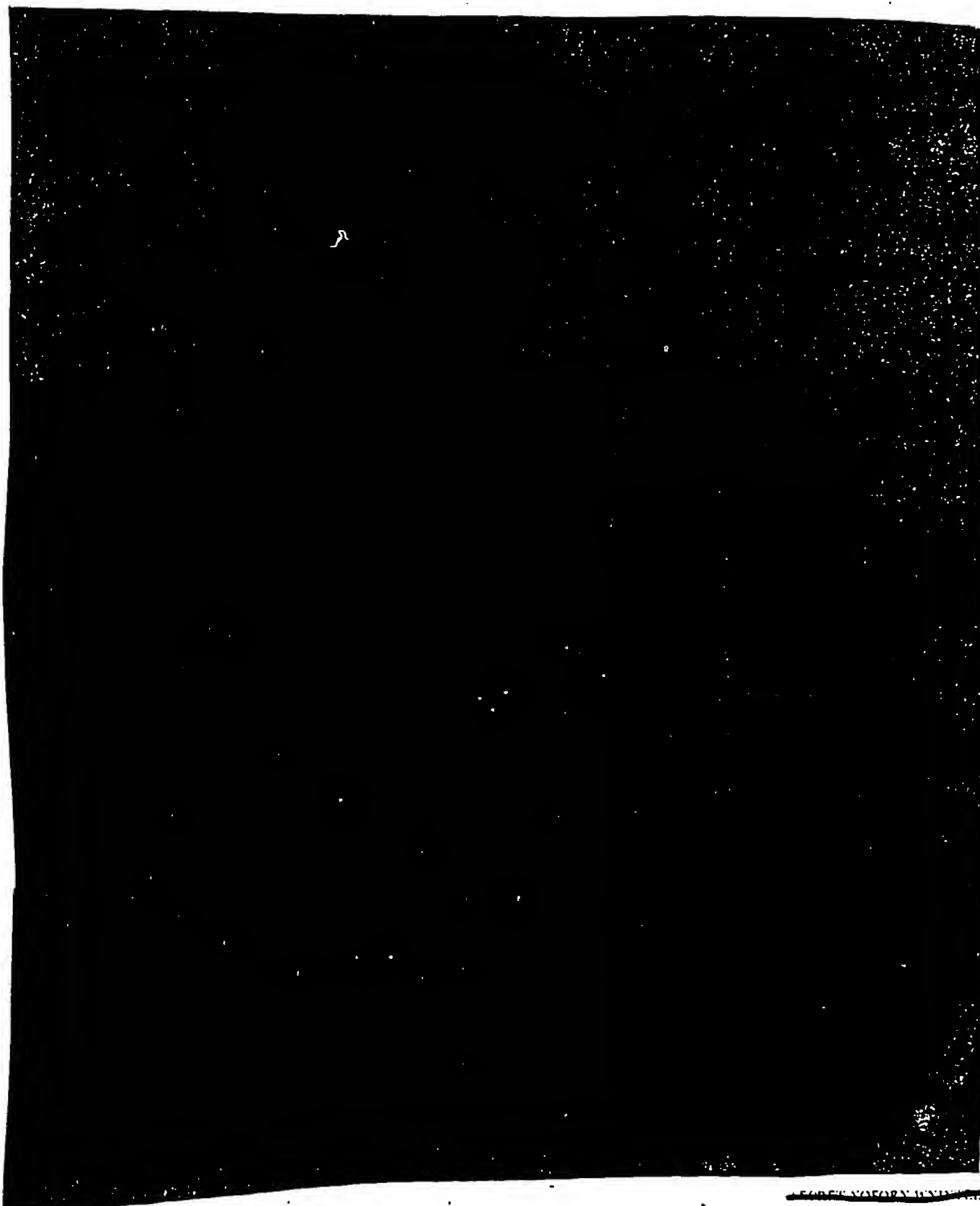


Fig. 23 (U) Airframe Plant 122, Harbin

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SECTION X.

FLIGHT TEST FACILITY RESOURCES (U)

1. Flight Test Research Institute, Xian (U)

(U) Alternate Name: 630 Research Institute

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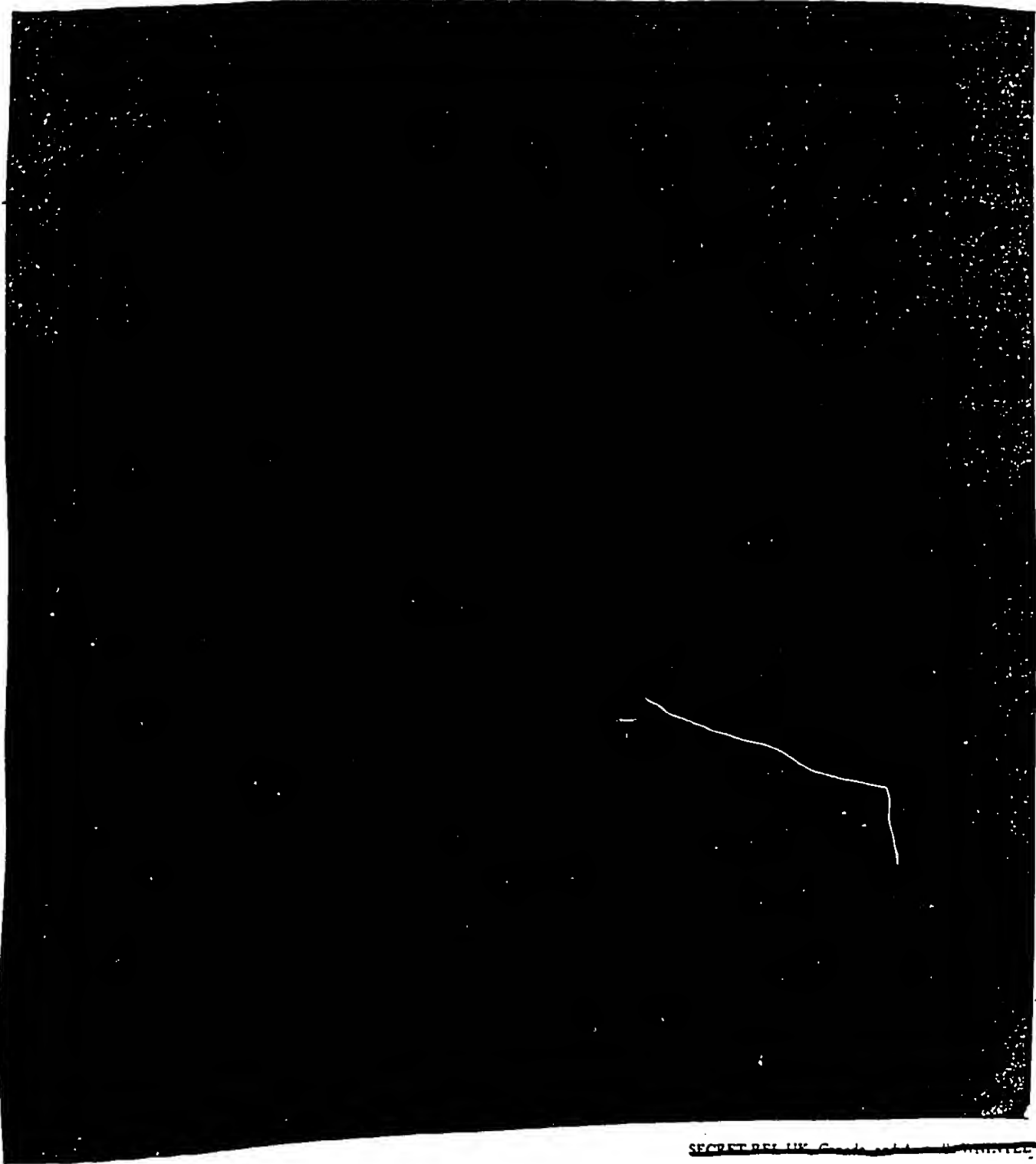


Fig. 24 (U) Flight Test Research Institute, Xian

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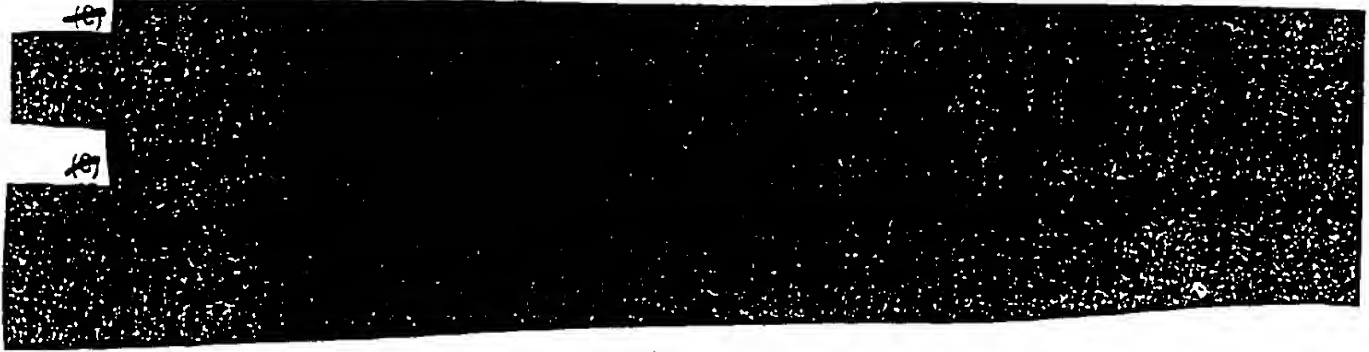
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SECTION XI

AIRCRAFT DESIGN AND DEVELOPMENT SUPPORT FACILITIES (U)



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1. Institute of Seaplane Research and Design, Jingmen (U)

(U) Alternate Name: 605 Research Institute (U)

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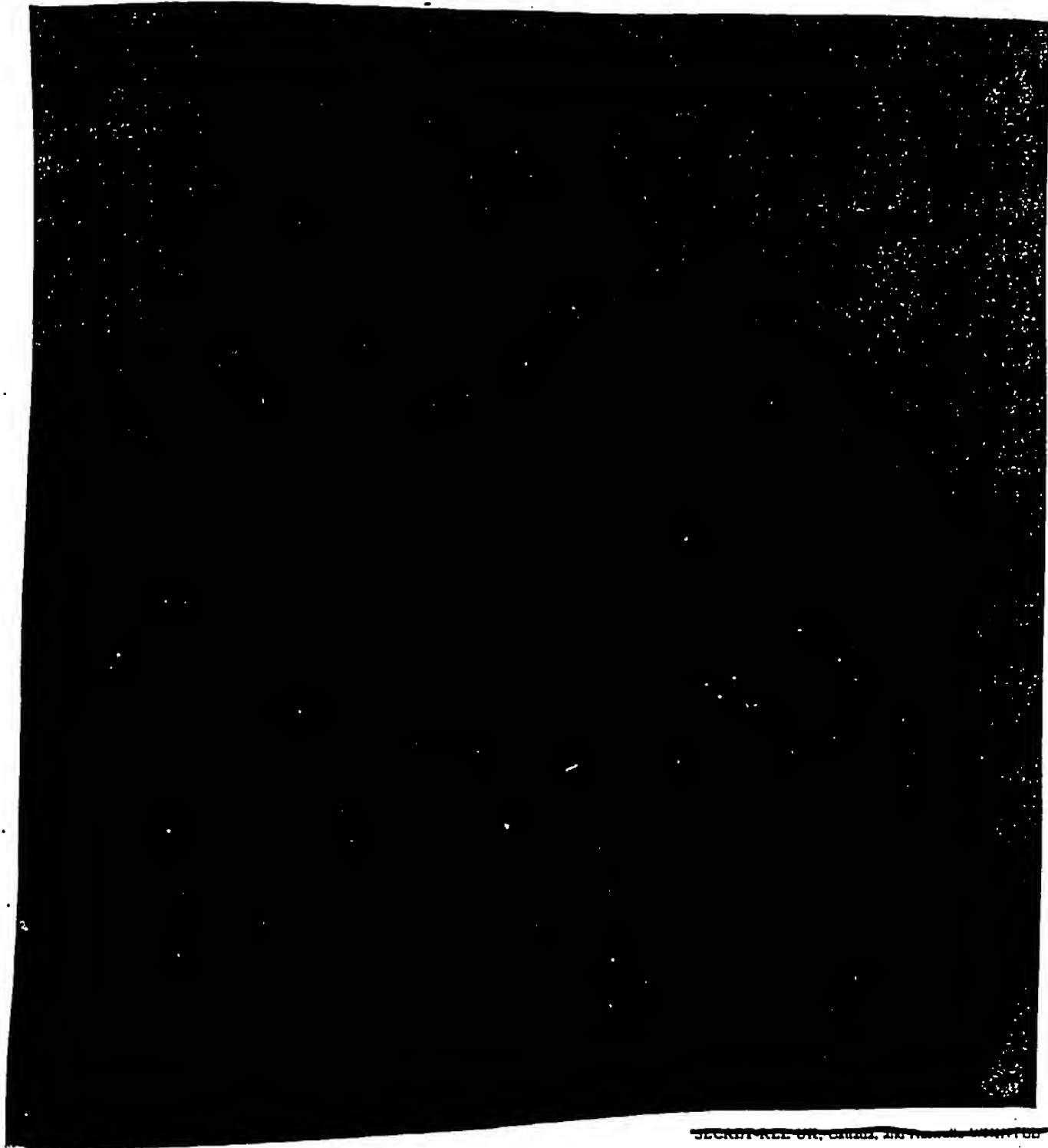


Fig. 25 (U) Seaplane Station, Jingmen

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2. 620 Research Institute, Beijing (U)

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3. Institute of Scientific and Technical Information, Beijing (U)

(U) Alternate Name: 628 Research Institute

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5. 634 Research Institute, Beijing (U)

(U) Coordinates: 35°13' N/116°24' E :

(U) Location: No. 2 Donghuan Nanlo Jianguomenwai. PO Box 2351, telephone numbers 591276, 596291-464, and 596291-402. Telecode 3182.



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6. 641 Research Institute, Jingdezhen (U)

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7. Aeronautical Institute, Nanjing (U)

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(U) Coordinates: 32°02' N/118°49' E

(U) The Nanjing Aeronautical Institute (NAI), formed in 1956, is located in the southern section of Nanjing. It is a technical university whose major strength is in aeronautical engineering, but it also offers courses in the physical science, management science, social science, and human science. The institute has approximately 100 teaching staff and 3,000 full-time students. The NAI is one of several institutes conducting research and development of helicopters, and is responsible for the first Chinese-designed helicopter.

(U) The Institute (Figure 26) has more than 20 special research organizations including the remote-pilot airplane research office and the aerodynamics research office. No rotating test stands are used at NAI; only static test stands are used. It has 38 laboratories that can be used for teaching and research, a large computing center, a test and measurement center, an electronic education center, and a computer-aided-design center. NAI also has a library hall with over 10,000 m² of building space and more than 700,000 books.

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(U) The purpose of the variable turbulence wind tunnel is to generate controlled turbulent flow. One area the tunnel is designed to study is the effect of turbulent flow on the development of the adherent surface layer of various geometric shapes. Surfaces experimented with in the past include flat plates and cylindrical bodies.

(U) The variable turbulence wind tunnel has test section dimensions of 1.2 x 0.3 x 6 m. Tunnel airflow velocity ranges from 8 to 42 m/s. A choice of seven variable-turbulence grid screens is used to change the degree of turbulence and structure of the air current in the test section. Slots upstream of the test section remove the boundary layer from the flow profile. The resulting turbulent flow is further controlled by an adjustable plate which is used to regulate the stationary pressure gradient in the axial direction. The variable turbulence wind tunnel appears to be used only for basic research.

(U) The supersonic blowdown wind tunnel is used primarily for engine inlet testing. The engine inlet model is located downstream of the variable pitch supersonic nozzle. The nozzle has flexible walls to vary airflow Mach number seen by the engine inlet.

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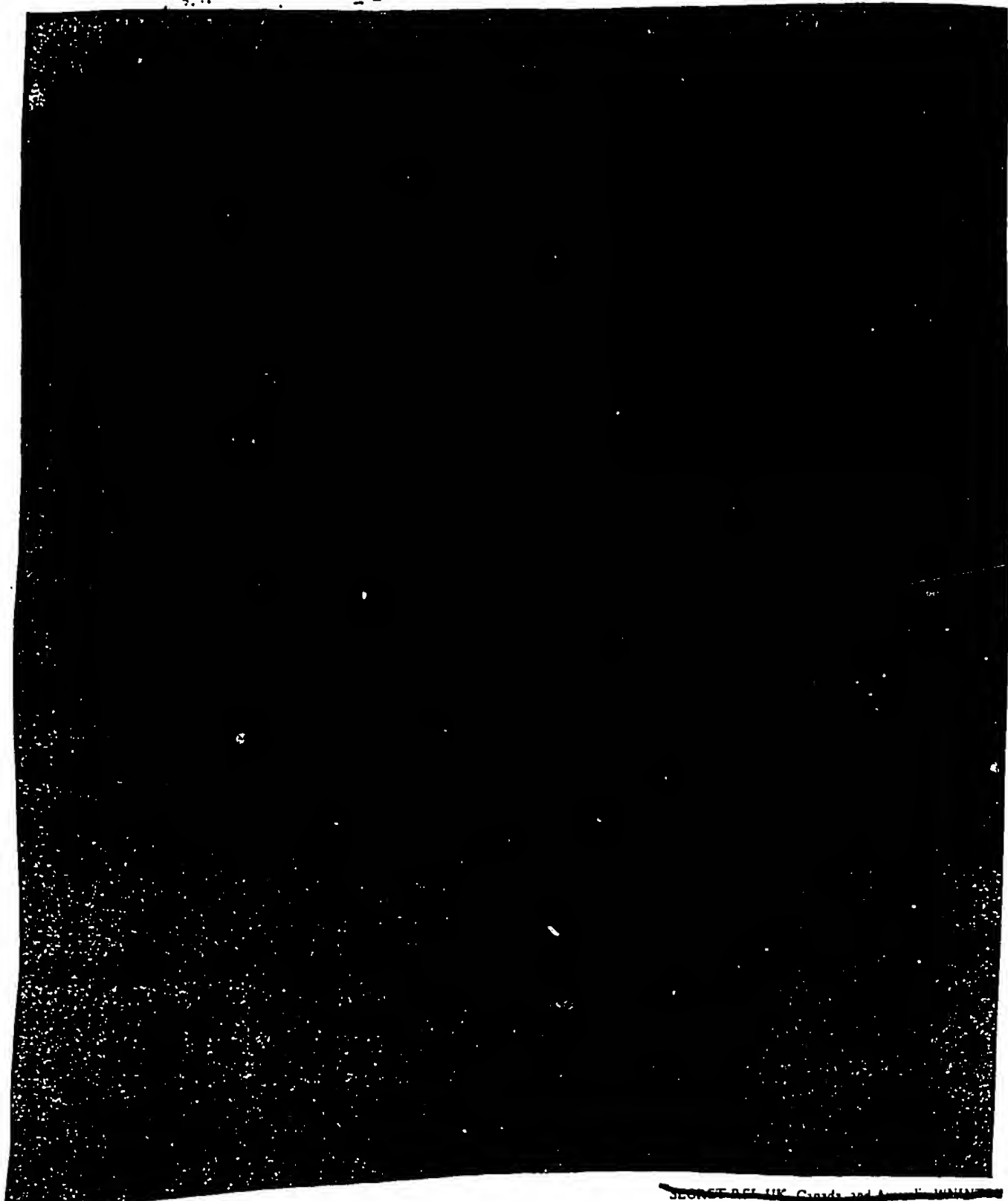


Fig. 26 (U) Nanjing Aeronautical Institute, Nanjing

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8. Northwest Polytechnical University, Xian (U)

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(U) Coordinates: 34°14' N/108°54' E

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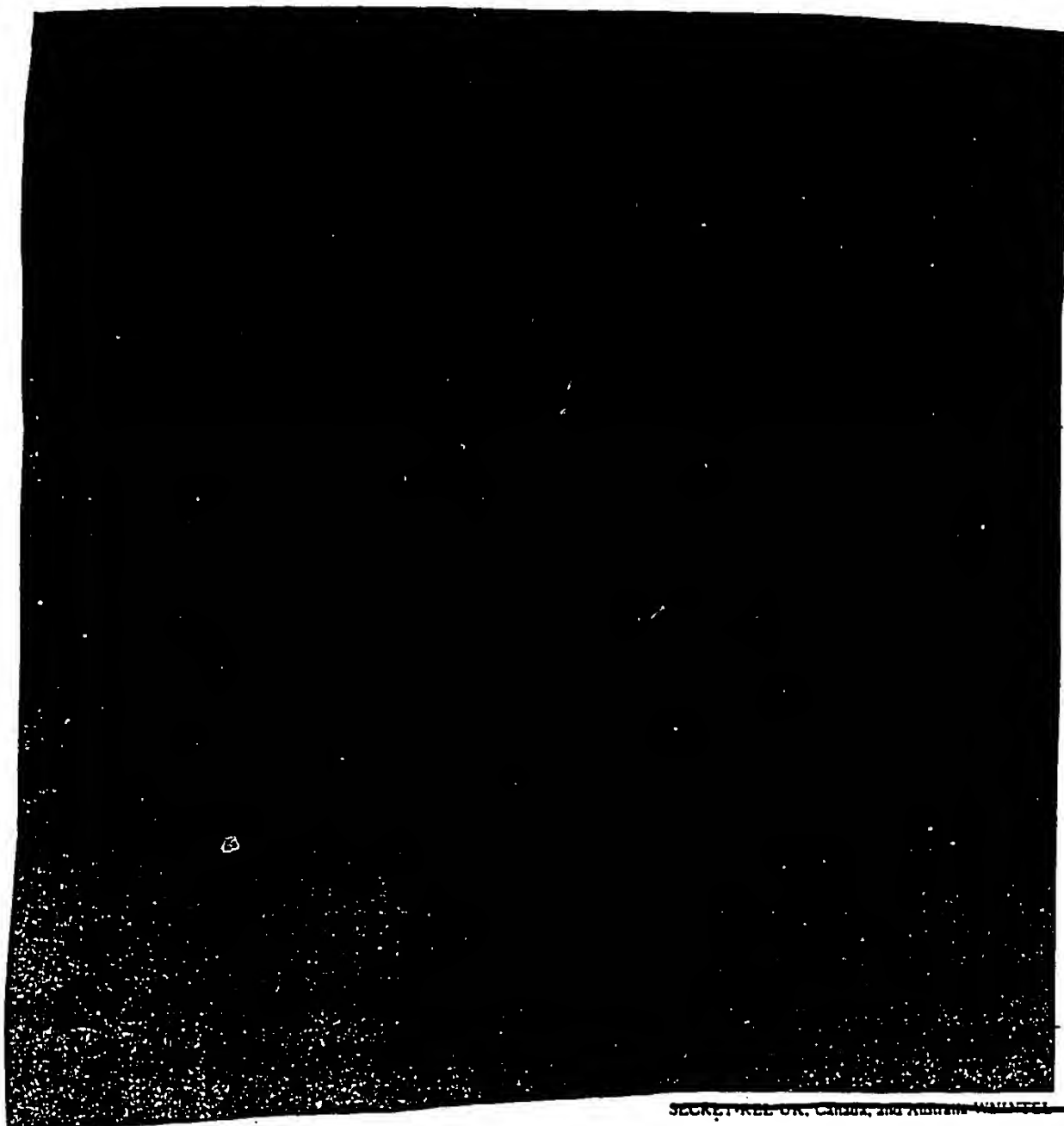
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Fig. 27 (U) Northwest Polytechnical University, Xian

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9. Institute of Aeronautics and Astronautics, Beijing (U)

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(U) Coordinates: 39°58' N/116°20' E

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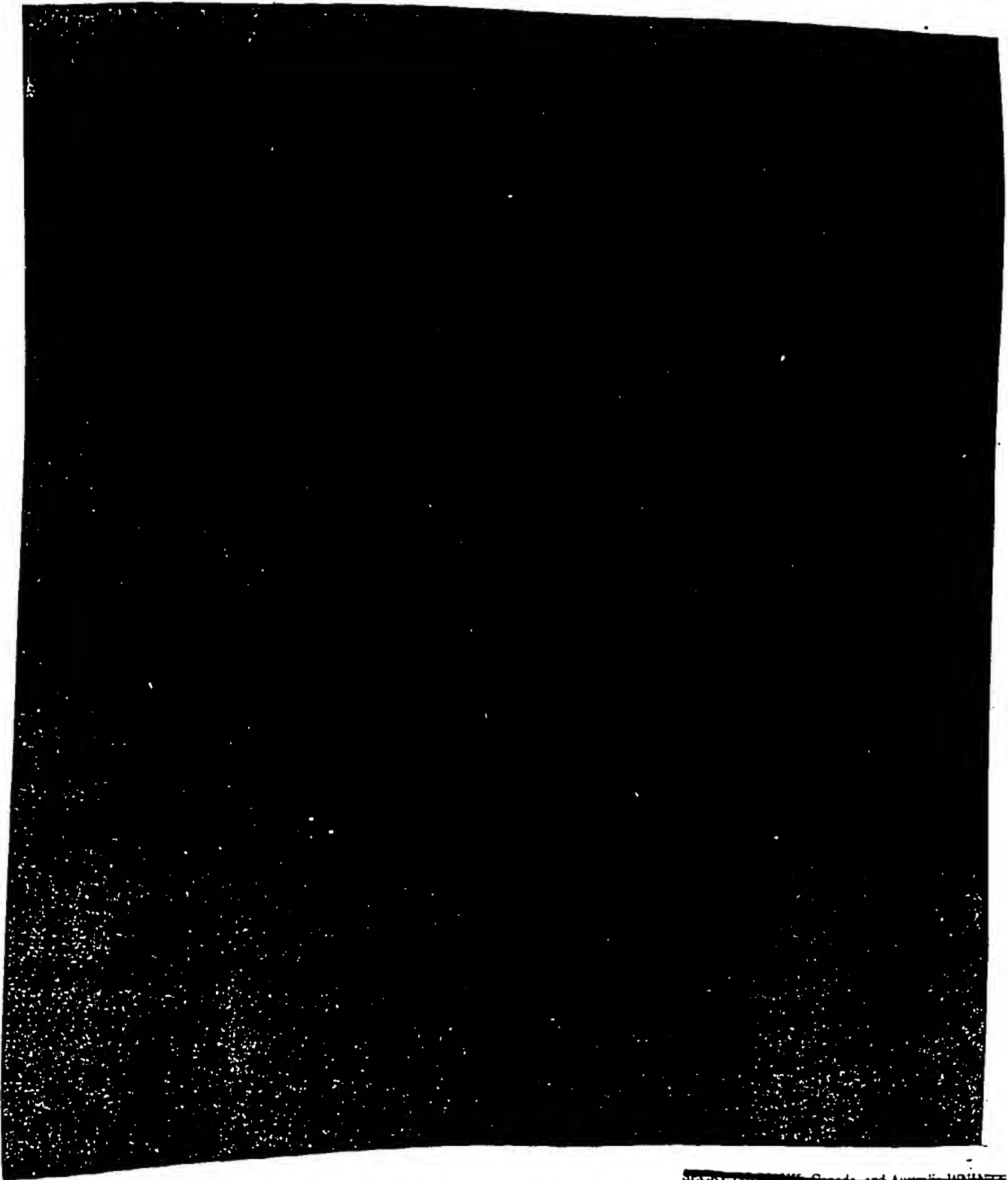


Fig. 28 (U) Beijing Institute of Aeronautics and Astronautics